

THE
BRITISH PALLADIUM:
OR,
Annual Miscellany
OF LITERATURE and SCIENCE:
For the YEAR 1770.

The first Part consisting of *New and Select* SUBJECTS, of general Utility.

The Second Part containing *Answers* to the former Year's useful Enquiries; with *new and curious Enquiries* proposed for the present YEAR.

For the Use of Gentlemen and Ladies, Youth at School, and also Navigators.

Serving both for *Land and Sea*.

The *Twenty-second* Number published.

Being a *Connexion*, and fit to be bound with, The NAUTICAL EPHEMERIS, and its KEY, for 1770.

By the Author of the *Improved and Perpetual* ROYAL ASTRONOMER and NAVIGATOR.



Let *Truth* and *Science* spread throughout this Land,
And *Literature* and *Art* go Hand in Hand!
Let *Sense* and *Reason*, *Wit* and *Fancy*, guide,
And *Critic Judgement* over all preside.

L O N D O N :

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by R. CARR, at *Portsmouth*; and by the Booksellers in Town
and Country. MDCCLXX. Price One Shilling.

P R E F A C E.

WHILE several Kinds of *periodical* Productions have been seen to perish in Succession, the *Palladium of Science* has continued to lift its Head for the Pleasure and Use of both Sexes; which nevertheless must, in Turn, come to its Period. For, since Men of Genius and Science have their Vicissitudes and Periods, *Books*, whether of greater or less Reputation, but the Works of Men, must suffer in the common *Catastrophe*! and, as the great *Shakespeare* observes, even the great Globe itself, and all which it inherit, shall fade away, and leave not a *Wreck* behind.

But, to extend the Use of the *Palladium*, as much as possible, during the Time of its Existence, we have now introduced it as a Connexion with the *Nautical Ephemeris*, and its *Key*, for the Purpose of *Longitude*; as it contains several Things useful to Navigators in their Voyage.

The *Seaman's Guide to the Longitude*, or, *KEY to the NAUTICAL EPHEMERIS*, just published, may be had of the Bookellers in Town and Country; and is designed as an Explanation of the said *Ephemeris*, and an Application of it to Practice at Sea, by *short Rules* and *familiar Examples*; to which the present and every future Year's *Palladium* does and will contribute its Aid. At the same Time some *Remarks* will continue to be made, for ascertaining how far the *lunar Method* of *Longitude* can be depended on for keeping a Ship's *Longitude* at Sea: Which a Course of diligent Observations, by our *Astronomer Royal*, at *Greenwich*, on the Distances and Times set down in the *Ephemeris*, would farther confirm; as his publishing an *Ephemeris* for longer Time than a Year forward would render it of Use for a long Voyage, which now serves but for Part of a short one; and the Money is thrown away, not only to the Government, paying for the great Expence of printing the Work, but to Sea-Officers, who are obliged to purchase a single Book.

The several Kinds of *defective* and *difficult* Rules, by which the Masters of the Navy have been taught the Use of the *Ephemeris*, as commanded by their Lordships of the *Admiralty*, so embarrassing to understand and apply, who were obliged to receive their qualifying Certificates from three appointed Teachers, (sometimes certifying contrary to one another) before they could be employed, excited the Publication of the *plain* and *short* Rules in the *Guide to the Longitude*, putting the said *Ephemeris* in Practice with greater Ease and Truth.

And it is equally amazing and deplorable, that no better than the *Cambridge Rules* (preferred by Favour and Interest) could be discovered, among our Mathematicians, for reducing the *apparent* to the *true* Distance of Objects, at Sea, wherein the main Difficulty consists in finding the *Longitude* from the *Ephemeris*.

Avert it, O Heaven, that our *British Universities* (from which Seminaries the Wisdom, Glory, and Happiness, of this Nation, should constantly flow) should ever be rival'd by *foreign Excellence*! While the *Chairs* of some of our endowed Schools, and public Academies, for qualifying our *British Youth* for the Sea and also *Land Service*, are said to be filled with Men of *low Parts and Education*, (the *Ushers* frequently superior to the mathematical Masters in Practice and Judgement), through Favour and Interest superseding superior Merit.

Cambridge and Oxford SAGES heretofore,
Supreme in Arts, the World did once adore!



To sit at BOARDS our Sages* must have done,
Or to their Aid must call in Em-r-n. †
Let him preside o'er mathematic Rules,
And be the Guide in academic Schools;
He'll teach you Truth and Science, without Fees,
From Qu-cks of Art to Doctors of Degrees.

* Who adjudged the Reward to the Cambridge Longitude-Rules, as superior to all others, for putting the Nautical Ephemeris in Practice at Sea; because it was for their own present Honour and Advantage.

† See his Course of Mathematics, (sold by Mr. Nourse in the Strand) improving on every Branch of mathematical Science before published.

THE PALLADIUM-AUTHOR.

REMARK.

* * Our Correspondents, in general, are desired to send all their Letters and Productions before the End of May, (franked or Post paid); the sooner they send the more they can be obliged; directed to the Palladium-Author, at Mr. Cole's, Mathematical-Instrument-Maker, in Fleet-street, London.

Where Gentlemen and Ladies may be accommodated with optical Glasses, and all Sorts of mathematical Instruments, of the newest Improvement; and may be supplied with new Instruments of any Kind, according to the Model of the Inventor, on reasonable Terms.

N. B. Here also all Masters of Men of War may be furnished with Longitude-Quadrants and Sextants, made by the best Hands, according to the greatest Accuracy, without being subject to Error by Warping, for observing the Distance of the Moon from the Sun or a Star, at Sea, by bringing them in Contact by Reflection; and for taking their Altitudes, by bringing the Object and Horizon together, by Reflection, to the greatest Precision that the Nature of such an Observation can admit of. Made for putting the Nautical Ephemeris in Practice; and keeping a Ship's Longitude, at Sea, by Observation, from the Meridian of the Royal Observatory at Greenwich.

Just published, and sold by Mr. Nourse, in the Strand, London,

A SYSTEM of ASTRONOMY: Containing the Investigation and Demonstration of the Elements of that Science. By W. EMERSON. Price 7s.

Motibus astrorum nunc quæ sit causa canamus. Lucret. l. 5.

Wherein new Improvements are made in every Branch of that Science.

I. And also Mechanics, or the Doctrine of MOTION. Comprehending, 1. The general Law of Motion. 2. The Descent of Bodies perpendicularly and down inclined Planes; and also in Curve-Surfaces. The Motion of Pendulums. 3. Centers of Gravity; the Equilibrium of Beams of Timber, and their Forces and Directions. 4. The mechanic Powers. 5. The comparative Strength of Timber and its Strefs. The Powers of Engines, their Motion and Friction. 6. Hydrostatics, and Pneumatics.

Da veniam scriptis, quorum non gloria nobis

Causa, sed utilitas officiumque fuit. Ovid. Pont. 3.

II. The Projection of the Sphere, orthographic, stereographic, and gnomonical; both demonstrating the Principles, and explaining the Practice, of these three several Sorts of Projection. Second Edition corrected. In minimis usus.

III. The Laws of centripetal and centrifugal Forces: Shewing the Motion of Bodies in circular Orbits, and in the conic Sections, and other Curves. Explaining the perturbing Force of a third Body. With many other Things of like Nature. Being a Work preparatory to Astronomy, and the very Basis thereof: And absolutely necessary to be known by all such as desire to be Proficients in that Science. *Solis uti varios, cursus lunæque meatus,*

Noscere possemus, quæ vis et causa fieret. Lucret. l. 5.

These Three Price 7s. together. By W. EMERSON. * * Improving on all former Improvements.

PALLADIUM-AUTHOR.

THE BRITISH PALLADIUM, or

A NEW GUIDE to the YEAR 1770.

P A R T I.

To find the Day of the Month from the Day of the Week, and Day of the Week from the Month-Day.

Against each Month of the Year, to the Right hand, stand the Seven Week-Days, above which stand all the Month-Days in that Month, answering to each Week-Day.

Contrarily. Under any Month-Day stands the Week-Day against that Month, at the Angle of Meeting.

MONTHS of the YEAR		MONTH DAYS and WEEK DAYS.						
		1	2	3	4	5	6	7
January.	October.	8	9	10	11	12	13	14
February.	March.	15	16	17	18	19	20	21
April.	July.	22	23	24	25	26	27	28
May.		29	30	31				
June.		Mo	Tu	We	Th	Fr	Sa	Su
August.		Th	Fr	Sa	Su	Mo	Tu	We
September.	December.	Su	Mo	Tu	We	Th	Fr	Sa
		Tu	We	Th	Fr	Sa	Su	Mo
		Fr	Sa	Su	Mo	Tu	We	Th
		We	Th	Fr	Sa	Su	Mo	Tu
		Sa	Su	Mo	Tu	We	Th	Fr

For Construction of the above Table, see P. 2, Palladium, 1763.

EXAMPLE I. To find the Day of the Month answering to the third Sunday in September, 1770.

To the Right-hand of September you find Su, or Sunday; directly above which, in the Columns among the Month-Days, stand 2, 9, 16, 23, and 30, answering to all the Sundays in September: Therefore the third Sunday is the 16th Day, required. So for other like Cases.

EXAMPLE II. To find the Day of the Week on which the 1st of April happens, 1770.

Under 1, the Month-Day, against April, at the Angle where both Columns meet, stands Su, or Sunday, required. So for other like Cases.

NOTES for 1770.		Moveable FEASTS.	SUN rises.				
Dom. Let. N.S.	G	Feb. 11. Septuages.	Mths.	1st	11th	21st	Examples.
O.S.	C	23. Ash-Wed.					
Golden Number	4	Mar. 4. 1 Sund. Lent		h	m	h	m
Epact (or D)'s Age at		Apr. 15. East. Sund.	Jan.	8	57	58	7 45
Year's Beginning)	3	May 20. Rog. Sund.	Feb.	7	22	7	66 30
Sun's Cycle	15	24. Ascension	Mar.	6	32	6	12 52
Roman Indiction	18	Jun. 3. Whitsunday	April	5	31	5	11 4 53
Æra Jul. Per. 6483		17. Trin Sund.	May	4	35	4	20 4 4
- Olympiads 2545		Dec. 2. Advent Sun.	June	3	51	3	45 4 43
- Found. Rome 2522			July	3	46	3	54 4 4
- Nabonasser 2516			Aug.	4	20	4	36 4 54
- Hegira 1148			Sep.	5	15	5	32 5 54
Gregorian Æra 188		Ember-Days.	Oct.	6	13	6	33 6 33
		April 7, 9, 10.	Nov.	7	12	7	30 7 45
Jul. Per. 1 Yr. more		June 6, 8, 9.	Dec.	7	58	8	68 8
than by French Acct,		Sep. 19, 21, 22.					
Nabonasser & Found.		Dec. 20, 22, 23.					
Rome 1 Year less.							

Astronomical

Astronomical MOONS for Greenwich Observatory, 1770.

First Quarter.			Full Moon.			Last Quarter.			New Moon		
Mths.	d	h m	d	h m		d	h m		d	h m	
Jan.	5	1 5M	11	5 7A	—	18	5 25A	—	26	11 1A	
Feb.	3	0 5A	10	4 13M	—	17	0 53A	—	25	3 41A	
Mar.	4	8 35A	11	3 55A	—	19	9 31M	—	27	5 33M	
Apr.	3	3 29M	10	4 29M	—	18	5 9M	—	25	4 41M	
May	2	8 51M	9	6 21A	—	17	10 11A	—	25	0 31A	
June	30	0 31M	8	9 21M	—	16	0 6A	—	23	8 31M	
July	29	11 36M	8	0 16M	—	15	11 6A	—	22	3 31A	
Aug.	28	2 27M	6	3 21A	—	14	8 3M	—	20	10 51A	
Sep.	26	8 26A	5	6 6M	—	12	3 26A	—	19	7 51A	
Oct.	26	4 31A	4	8 11A	—	11	10 11A	—	18	7 26A	
Nov.	25	0 56A	3	9 31M	—	10	5 1M	—	17	10 6M	
Dec.	25	8 11M	2	10 5A	—	9	1 21A	—	17	3 31M	

N. B. M stands for Morning and A for Afternoon.

Add to the Month-day for the Moon's Age.		New D.	Sun and Moon's Place at New Moon.	Sun enters Signs.	Sub. and add from and to D's Southing for her Rising & Setting.		To find the Tides at London.	
					Moon's Place.	Arc \mp .	Rule. Add 2 ^h 30 ^m to Time of D's Southg (fr. the Table of her Southing) for Time of High Water required.	
Jan.	3	26	8 0	d	8 0	h m	Ex. July 20, 1770, D's Southg, by Tab. following 9 ^h 42 ^m Add 2 30	
Feb.	5	25	10 7	♊ 19	3 0	8 30	H.W. 0 2 12	
Mar.	3	27	11 7	♋ 18	4 2	8 15	Add 5 30	
Apr.	4	25	0 7	♌ 20	5 1	7 15	L.W. 5 2 42 at Lond. Bridge.	
May	5	25	1 5	♍ 20	6 0	6 15	N.B. Time of H. & L.W. at Lond. serves for Boats bound down & up the R. or fr ab. & below Bridge, to Lond. respecty.	
June	6	23	2 4	♎ 21	7 11	5 15	Gen. Rule. Add the T. of H.W. at N. and Full D for any Place, accordg to a Tide-Tab. to the Time of D's Southg, that Day, for H.W. at that Place.	
July	7	22	3 2	♏ 21	8 10	4 15		
Aug.	9	20	4 0	♐ 22	9 0	4 0		
Sep.	11	19	4 27	♑ 23	9 20	4 15		
Oct.	11	18	5 27	♒ 23	10 29	5 15		
Nov.	13	17	6 25	♓ 23	0 0	6 15		
Dec.	13	17	7 25	♊ 22	0 29	7 15		
			8 26	♋ 21	1 28	8 15		
Here the Day of N. D and N ^o . added for the following Month make up the Days in the present Month.			Ex. II. Sept. 23 Add 11 34 Abate 30 Moon's Age 4 N.B. When Age is above 29 or 30 Ds. sub. 29 or 30, as 1st & 2d Cols make 29 or 30.		Req D's Pl. Ap. 20. D's Age 24 by 13 ^h 12 ^m = 10 ^h 12 ^m D's Pl. at } 1 5 N. D add } D Pl. Ap. } 11 17 20, Noon } A near Comput. only			
Exam. Jan. N. D 26, and Feb. 5, added = 31 Ds. in Jan. the present Month. N D Se. 19 & Oct. 11 added = 30 Ds. in Sept. &c			Sub. or add Deg. for Ds. bef. or aft. ☉ enters a Sn. for his Place. Required Sun's Place April 29, 1770.		Req. Moon's Rising & Setting, Ap. 20, 1770			
To find Moon's Age.			April 29, 1770.		D m. Pl. ab. 11 ^h 17 ^m			
Ex. I. April 15			25 Ap. ☉'s Pl. 1 ^h 5 ^m		Arc * corref \mp 5 ^h 50			
Add 4			4 Ds. & Degs. 0 4		D's So. that D. 7m 45			
Moon's Age. 19			29 Ap. ☉'s Pl. 1 9		Moon rises 1m 55 Sets 1a 35			
					N.B. Take the * Arc \mp nearest or proportion. to D's Place above.			

*N. B. The Festival marked * is preceded by a Vigil or Fast. If any of the Fast-days fall on a Monday, the Vigil or Fast-day must be kept on the Saturday before, and not on the Sunday, which is the greatest of Festivals.*

The Days having this Mark, †, against them are Holidays observed at the Exchequer, Stamp Office, Excise-Office, Custom-House, Bank, East India and South-sea House.

At the Custom-House there is no Holiday on Valentine, St. David, Shrove-Tuesday, Easter-Wednesday, St. Swithin, Lammas-day, Fire of London, or Holy-Rood.

††† The Offices are mentioned 'All but such and such,' after †, where no Holidays are kept, when they are kept in all the other Offices.

JANUARY, XXXI DAYS.

- 1 Circumcision. †
- 4 Sir Isaac Newton born 1643.
- 5 Old Christmas-day.
- 6 Epiphany, or Twelfth-day. †
All but South-sea House.
- 7 1 Sunday after Epiphany.
- 8 Lucian.
- 13 St. Hilary.
- 14 2 Sunday after Epiphany.
- 15 Exchequer opens. Oxford and Cambridge Terms begin.
- 17 Old Twelfth-day.
- 18 Prisca, Q. Cha. Birth-day kept. †
- 20 Fabian. 1 Return.
- 21 3 Sunday after Epiphany. Agnes.
- 22 Vincent.
- 23 Hilary Term begins.
- 25 Conversion of St. Paul. †
- 27 2 Return.
- 28 4 Sunday after Epiphany.
- 30 K. Charles I. beheaded 1648-9,
O. S. 12 Minutes past One. †

FEBRUARY, XXVIII DAYS.

- 2 Purific. B. V. or Candlemas. †
- 3 Bishop Blaize. 3 Return.
- 4 5 Sunday after Epiphany.
- 5 Agatha.
- 9 4 Return.
- 10 Dies scolastica at Oxford.
- 11 6 *Sx. after Epiph. Septuagesima.*
- 12 Hilary Term ends.
- 13 Old Candlemas-day.
- 14 Valentine. † All but Stamp, Custom, and South-sea House.
- 18 7 *Sun. after Epiph. Sexagesima.*
- 24 St. Matthias. * †
- 25 *Shrove Sunday, or Quinquagesima.*
- 26 Shrove Monday.
- 27 Shrove Tuesday. † All but the Custom-House.

- 28 Ash-Wednes. † 1 Day in Lent,
Hare-hunting goes out.

MARCH, XXXI DAYS.

- 1 Cambridge Commencement for
B. A. Day after Ash Wednes.
St. David. Anniversary Meeting
of the Welch Society, who
wear a Leek on this Day in
Memory of a famous Victory
gained over the Saxons. † All
but the Stamp and Custom-H.
- 2 Chad. B.
- 4 *Quadragesima. 1 Sunday in Lent.*
Hilary Term ends.
- 5 Princess Mary of Hesseb. 1722.
- 7 Perpet. Maurit.
- 7, 9, and 10, Ember-days.
- 11 2 Sunday in Lent.
- 16 Gregory.
- 17 St. Patrick, Bishop of Ireland.
- 18 3 Sunday in Lent. Edward,
King of the West Saxons.
- 19 Joseph.
- 20 Cuthbert. Equal Day and Night.
- 21 St. Benedict.
- 25 4 Sunday in Lent. LADY-DAY.
First Quarter-day. Annun-
ciation. †
- 29 Cambridge latter Aft, Thurs-
day after the 4th Sun. in Lent.

APRIL, XXX DAYS.

- 1 5 Sunday in Lent. Fool's-Cap
Day, or Exeter Jack.
- 3 Richard, B. of Chichester.
- 4 St. Ambrose.
- 5 Old Lady-day.
- 7 Oxford and Cam. Terms end.
- 8 6 Sunday in Lent. Palm-Sund.
- 12 Maunday-Thursday.
- 13 Good-Friday. †

15 EASTER.

- 15 **EASTER SUNDAY.** Sun and
Clocks together.
16 Easter Monday. †
17 Easter Tuesday. †
18 Easter Wednesday. † All but
the Custom-house.
19 Alphege.
22 1 Sunday after Easter.
23 St. George. †
25 St. Mark. † Oxford and Cam-
bridge Terms begin.
27 Victory of Culloden.
29 2 Sunday after Easter.
30 1 Return.

MAY, XXXI DAYS.

- 1 St. Philip and James. †
2 Easter Term begins.
3 Invention of the Cross.
6 3 Sunday after Easter. St. John
ante Port. Lat.
12 Old May-day.
13 4 Sunday after Easter.
14 3 Return. Westminster Election.
19 Dunstan.
20 5 Sunday after Easter. Rog. Sund.
21 4 Return.
21, 22, 23, Rogation-days.
24 Ascension-day. † All but the
South-sea House.
25 5 Return.
26 St. Augustine. No Night but
Twilight.
27 6 Sunday after Easter. Ven. Bede.
28 Easter Term ends.
29 King Charles II's Nativity and
Rest, after 12 Years Exile.

JUNE, XXX DAYS.

- 1 Nicomedes.
3 **WHIT-SUNDAY.**
4 King George III. born 1738. †
Whit-Monday. †
5 Boniface. Whit-Tuesday. †
6 Whit-Wednesday. † All but
the Custom-house.
6, 8, and 9, Ember-days.
10 Trinity-Sunday. Princess Amelia
born, 1711. † All but the
Exchequer and Custom-house.
11 St. Barnabas. † 1 Return.
14 Corpus Christi.
15 Trinity Term begins.
17 1 Sunday after Trinity, St. Alban.
18 2 Return.

- 20 Transl. of Edw. K. W. Saxons.
22 Longest Day.
24 2 Sun. after Trinity. St. John
Baptist. † ad Quarter-day.
25 St. John's Col. Elect. 3 Return.
29 St. Peter and Paul. †
30 Buck-hunting comes in and con-
tinues till Holy-rood. Exeter
and Wadham Col. Elect. at Oxf.

JULY, XXXI DAYS.

- 1 3 Sunday after Trinity.
2 Visitation B. V. M. 4 Return.
3 Dies Comitiourum. Cambridge
Com. for B. A. 1 Tues. in July.
4 Trinity Term ends. Translat.
of St. Martin, Bishop.
5 Old Midsummer-day.
7 Tho. à Becket, Church Tyrant.
8 4 Sunday after Trinity.
10 Oxford Act, 7 Days from Cam-
bridge Commencement.
15 5 Sun. after Trin. St. Swithin. †
All but Stamp, Cust. & S. S. H.
20 Margaret, Virgin and Martyr.
22 6 Sun. af. Trin. Mary Magdalen.
Q. of Denmark born 1751. †
24 Magdalen College Election.
25 St. James. * †
26 St. Ann, Mother of B. V. M.
29 7 Sunday after Trinity.
30 Dog-days begin. Canicula ri-
ses with the Sun.

AUGUST, XXXI DAYS.

- 1 Lammas Day. †
4 Crown-Point in America taken
by General Amherst, 1759.
5 8 Sunday after Trinity.
6 Transfiguration.
7 Name of Jesus.
10 St. Laurence.
11 Princess of Brunswick b. 1737. †
All but Cust. and S. S. H.
12 9 Sunday after Trinity. Old
Lammas-day. Pr. Wales b. †
15 Assumption.
19 10 Sunday after Trinity.
21 Athanasius.
24 St. Bartholomew. †
26 11 Sunday after Trinity.
28 St. Austin.
29 Beheading of St. John Baptist.
30 Sun and Clocks together.

SEPTEMBER, XXX DAYS.

- 1 Giles.
 2 12 *Sunday after Trinity.* London burnt, 1666, O. S. †
 7 Eunuchus.
 8 Nativity of the B. V. M.
 9 13 *Sunday after Trinity.* Dog-days end. Canis Major rises at 3 in the Morning.
 14 Holy-Cross Day. † All but St. Cust. and South-sea House.
 16 14 *Sunday after Trinity.*
 17 Lambert B.
 18 City of Quebec surrendered to General Townshend, 1759. K. George I. and II. landed. † All but at the Custom-house.
 19, 21, 22, Ember-days.
 21 St. Matthew. †
 22 Equal Day and Night. K. Geo. III. and Q. Char. Coron. †
 23 15 *Sunday after Trinity.*
 26 St. Cyprian.
 28 Sheriffs of London sworn.
 29 St. MICHAEL, third Quarter-Day † Hare hunting comes in and lasts till the End of Feb.
 30 16 *Sun. after Trin.* St. Jerome.

OCTOBER, XXXI DAYS.

- 1 Remigius, Bishop of Rhemes.
 6 St Faith.
 7 17 *Sunday after Trinity.*
 9 St. Dennis.
 10 Old Michaelmas-day. Oxford and Cambridge Terms begin.
 13 Transl. of K. Edw. Confessor
 14 18 *Sunday after Trinity.*
 17 Etheldred V.
 18 St. Luke the Evangelist. †
 19 St. Frideswide, a Festiv. at Court.
 21 19 *Sunday after Trinity.*
 25 K. George III. inaugurated. †
 26 St. Crispin. K. Geo. III. proclaimed. † All but the Stamp, Excise, Customs, and S. S. H.
 28 20 *Sunday after Trinity.* St. Simon and Jude. †

NOVEMBER, XXX DAYS.

- 1 All Saints. †

- 2 All Souls. † All but Stamp, Custom, and South-sea House.
 3 All Souls Col. Elect. 1 Return.
 4 21 *Sunday after Trinity.* King William born 1605, O. S. †
 5 Gun-Powder Treason. †
 6 Leonard. Mich. Term begins.
 7 Duke of Cumberland b. 1745.
 9 Lord Mayor's Day, London. † All but the Exchequer.
 11 22 *Sun. after Trin.* St. Martin.
 13 Britius, B. shop. 2 Return.
 15 Machutus.
 17 Hugh. Annivers. of Q. Eliz. Procl. † All but Cust. & S. S. H.
 18 23 *Sun. after Trin.* 3 Return.
 20 Edmund King and Martyr.
 22 Cecilia. Old Martinmas-day.
 23 St. Clement.
 25 24 *Sun. after Trin.* St. Catherine. 4 Return. Duke of Gloucester born 1743. †
 28 Michaelmas Term ends.
 29 Balioi Col. Election Thursday before St. Andrew.
 30 St. Andrew, † Princess Dowager of Wales born, 1719. †

DECEMBER, XXXI DAYS.

- 2 *Advent Sunday.*
 4 Barbary.
 6 Nicholas.
 8 Conception of the V. M.
 9 2 *Sunday in Advent.*
 13 Lucy.
 16 3 *Sun. in Adv.* O Sapientia.
 17 Oxford and Cam. Terms end.
 19, 21, 22, Ember-days.
 21 St. Thomas. †
 22 Shortest Day.
 23 4 *Sunday in Advent.* Sun and Clocks together.
 25 CHRISTMAS-DAY, 4th Quarter Day. Fox-hunting comes in and lasts till Lady-day.
 26 St. Stephen. †
 27 St. John the Evangelist. †
 28 Holy Innocents. †
 30 *Sunday after Christmas.*
 31 Silvester, Bishop of Rome.

TABLE of the MOON'S Southings, or when she passes the Meridian of Greenwich Observatory, for the Year 1770. For the Use of Seamen.

D.	Jan.	Feb.	Mar.	Apr.	May	June.	July.	Aug.	Sept.	Oct.	N. v.	Dec.
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	3 ^a 13	4 ^a 5	2 ^a 55	4 ^a 46	5 ^a 39	6 ^a 55	7 ^a 9	8 ^a 16	9 ^a 29	9 ^a 45	10 ^a 46	11 ^a 7
2	3 58	4 55	3 48	5 45	6 32	7 42	7 56	9 3	10 13	10 30	11 37	Morn
3	4 42	5 49	4 44	6 43	7 22	8 29	8 44	9 53	10 58	11 16	Morn	0 6
4	5 28	6 47	5 42	7 37	8 11	9 16	9 33	10 40	11 41	Morn	0 31	1 7
5	6 16	7 47	6 42	8 30	8 58	10 3	10 21	11 26	Morn	0 3	1 28	2 9
6	7 9	8 48	7 42	9 20	9 45	10 52	11 9	Morn	0 25	0 51	2 28	3 7
7	8 7	9 49	8 39	10 8	10 34	11 42	11 58	0 10	1 9	1 43	3 28	4 2
8	9 7	10 47	9 34	10 56	11 20	Morn	Morn	0 54	1 56	2 37	4 26	4 55
9	10 9	11 43	10 28	11 45	Morn	0 30	0 43	1 38	2 46	3 34	5 22	5 45
10	11 13	Morn	11 19	Morn	0 9	1 18	1 28	2 21	3 37	4 33	6 15	6 35
11	Morn	0 36	Morn	0 33	0 58	2 5	2 12	3 5	4 33	5 31	7 7	7 22
12	0 13	1 26	0 8	1 22	1 52	2 51	2 54	3 51	5 30	6 28	7 58	8 10
13	1 11	2 15	0 57	2 12	2 38	3 35	3 37	4 41	6 31	7 24	8 45	8 59
14	2 5	3 3	1 44	3 2	3 26	4 19	4 19	5 34	7 28	8 18	9 34	9 49
15	2 55	3 50	2 35	3 51	4 12	5 2	5 6	6 30	8 25	9 9	10 21	10 27
16	3 43	4 39	3 24	4 40	4 57	5 46	5 53	7 29	9 22	9 59	11 12	11 28
17	4 30	5 27	4 13	5 28	5 42	6 29	6 45	8 29	10 16	10 50	0 ^a 3	0 ^a 18
18	5 15	6 16	5 2	6 15	6 26	7 16	7 41	9 32	11 9	11 40	0 55	1 5
19	6 1	7 4	5 52	7 0	7 10	8 7	8 40	10 30	0 ^a 2	0 ^a 31	1 46	1 51
20	6 48	7 53	6 40	7 45	7 53	9 2	9 42	11 27	0 53	1 22	2 35	2 37
21	7 36	8 42	7 28	8 30	8 42	9 50	10 45	0 ^a 22	1 44	2 13	3 22	3 18
22	8 24	9 29	8 14	9 15	9 32	11 4	11 46	1 16	2 35	3 5	4 7	4 1
23	9 13	10 15	9 0	10 2	10 26	0 ^a 8	0 ^a 46	2 6	3 26	3 55	4 52	4 44
24	10 0	11 0	9 44	10 52	11 24	1 10	1 41	2 56	4 17	4 45	5 34	5 25
25	10 49	11 46	10 31	11 46	0 ^a 27	2 9	2 33	3 46	5 8	5 31	6 16	6 8
26	11 35	0 ^a 30	11 18	0 ^a 42	1 29	3 5	3 24	4 36	5 57	6 16	6 59	6 54
27	0 ^a 20	1 17	0 ^a 5	1 41	2 32	3 57	4 13	5 27	6 46	7 0	7 43	7 43
28	1 4	2 4	0 56	2 43	3 31	4 46	5 2	6 16	7 32	7 43	8 30	8 38
29	1 48		1 50	3 44	4 27	5 35	5 40	7 6	8 17	8 28	9 18	9 33
30	2 32		2 46	4 43	5 18	6 21	6 38	7 54	9 1	9 12	10 11	10 33
31	3 18		3 45		6 8		7 28	8 43		9 58		11 35

To find Time of H. Water, on any Day of the Month, at any given Place, for 1770.

Gen. Rule. To the Time of the Moon's Southings (fr. the above Tab.) for that Day, add the Time of H. W. at N. and F. Moon in the given Place (fr. Tide-Tab. p. 105, 106, Pal. 1765) and the Sum, abating 12, when above 12 Hours, will be the Time of H. Water, req.

Example. To find the Time of High Water, at London, on May 20, 1770.

From the above Table, the Moon souths, at London, on that Day, 7^h 53^m Morn.

To which add the constant Time of High Water at New and Full, 2 30

Time of High Water, May 20, at London, 10 23 M. req.
Add for next Low Water, 5 30

Low Water at London, May 20, 3 53 A.

N. B. Time of High Water serves for Boats bound to Places below Bridge, from London; and Time of Low Water serves for Boats bound to Places above Bridge, from London.

*** Seamen may determine the Time of H. & L. W. at all Places by the foregoing Gen. Rule, fr. the above Tab. and the constant Time of H. W. at N. & F. Moon, at each Place, fr. a Tide Table. The above Table is also of Use for finding the Moon's near Time of Rising and Setting, from her mean Place, and Semi-duration Arch, for any Place.

TABLE of the Eclipses of the first SATELLITE of JUPITER. for Gr. Obs. 1770.

January.				February.				March.				April.				May.				June.			
Immerf.				Immerf.				Immerf.				Immerf.				Immerf.				Immerf.			
D.	h	m	s	D.	h	m	s	D.	h	m	s	D.	h	m	s	D.	h	m	s	D.	h	m	s
1	9	18	59	2	5	38	24	2	13	12	29	1	15*	21	52	1	17	30	49	2	14*	2	42
3	3	46	29	4	0	6	29	4	7	41	8	3	9	50	45	3	11*	59	24	4	8*	30	59
4	22	14	1	5	18*	34	37	6	2	9	49	5	4	19	37	5	6	27	59	6	2	59	17
6	16	41	34	7	13	2	47	7	20	38	31	6	22	48	27	7	0	56	31	7	21	27	33
8	11	9	8	9	7	30	59	9	15*	7	15	8	17	17	17	8	19	25	3	9	15	55	46
10	5	36	43	11	2	0	14	11	9	35	58	10	11	46	6	10	13*	53	34	Emerfions			
12	0	4	19	12	20	27	32	13	4	4	43	12	6	14	53	12	8	22	5	11	12*	34	28
13	18*	31	57	14	14	55	52	14	22	33	28	14	0	43	39	14	2	50	35	13	7	2	45
15	12	59	37	16	9	24	14	16	17*	2	14	15	19	12	15	15	21	19	4	15	1	31	3
17	7	27	19	18	3	52	38	18	11	31	3	17	13*	41	11	17	15*	47	32	16	19	59	19
19	1	55	2	19	22	21	4	20	5	59	53	19	8	9	56	19	10*	15	59	18	14*	27	35
20	20	22	47	21	16*	49	33	22	0	28	44	21	2	38	42	21	4	44	23	20	8*	55	52
22	14	50	36	23	11	18	6	23	18	57	35	22	21	7	27	22	23	12	45	22	3	24	9
24	9	18	26	25	5	46	39	25	13*	26	35	24	15*	36	9	24	17	41	7	23	21	52	28
26	3	46	20	27	0	15	15	27	7	55	36	26	10	4	52	26	12*	9	28	25	16	20	47
27	22	14	17	28	18	43	51	29	2	24	8	28	4	33	33	28	6	37	47	27	10*	49	8
29	16*	42	17					30	20	53	0	29	23	2	11	30	1	6	6	29	5	17	31
31	11	10	20													31	19	34	24	30	23	45	53

July.				August.				Septemb.				October.				November.				December.			
Emerfions				Emerfions				Emerfions				Emerfions											
D.	h	m	s	D.	h	m	s	D.	h	m	s	D.	h	m	s	A Conjunction of Jupiter with the Sun happens this Month, from which Cause, or his Nearnefs to the Sun, neither his firft, nor any other of his Satellites can be feen this Month, nor yet in the following Mth of December.				The Afterifm (*) is placed againft the vifible Eclipses of the firft Satellite of Jupiter, for Greenwich. N.B. When the Time at the Ship is later than that at Greenwich, the Longitude is Eaft; if fooner, Weft from Greenwich.			
2	18	14	15	1	20	21	37	2	17	7	43	1	0	59	36								
4	12*	42	40	3	14	50	38	4	11	37	11	2	19	29	0								
6	7	11	8	5	9*	19	40	6	6	6	40	4	13	58	23								
8	1	39	36	7	3	48	45	8	0	36	11	6	8	27	40								
9	20	8	4	8	22	17	50	9	19	5	43	8	2	57	1								
11	14	36	38	10	16	46	58	11	13	35	13	9	21	26	19								
13	9*	5	13	12	11*	16	7	13	8*	4	43	11	15	55	35								
15	3	33	50	14	5	46	17	15	2	34	13	13	10	23	52								
16	22	2	28	16	0	14	30	16	21	3	43	15	4	53	6								
18	16	31	7	17	18	43	44	18	15	33	12	16	23	23	18								
20	10*	59	47	19	13	12	59	20	10	2	41	18	17	52	27								
22	5	28	30	21	7*	42	14	22	4	32	10	20	12	21	33								
23	11	57	16	23	2	11	30	23	23	1	39	22	6	49	39								
25	18	26	4	24	20	40	50	25	17	31	8	24	1	19	41								
27	12	54	52	26	15	10	11	27	12	0	37	25	19	48	41								
29	7	23	44	28	9*	39	32	29	6*	30	6	27	14	17	38								
31	1	52	39	30	4	8	55					29	8	46	33								
				31	22	38	18					31	4	15	25								

To find the Difference of Longitude from Greenwich Obfervatory.

Rule. The Difference of Time between any Eclipse of Jupiter's first Satellite, at Greenwich, happening as above, and the Time the same Eclipse is observed to happen under a distant Meridian, being turned into Degrees, will be the Difference of Longitude between Greenwich and the Place of Observation.

Example. Eclipse of 1st Satellite of Jupiter at Greenwich, April 3^d 9^h 50^m 45^s
The same observed at Sea, later, 3 13 38 20

Hence, Long. to the East of Greenwich, 56° 45' 8", req. Dif. 3 47 35

Two ECLIPSES of the SUN, None of the MOON, for 1770.

I. Of the Sun. May 25^d 1^h 29^m Morn. invisible. Moon's Latitude 10' North, Centrally and totally eclipsed, at Noon, in 175° $\frac{1}{2}$ Longitude, and 31° Latitude N. Point falls in the South Sea, opposite to China and Japan.

II. Of the Sun. November 17^d 10^h 9^m Morn. Moon's Latitude 8' South. This Eclipse is central and annular, at Noon, in 45° $\frac{1}{2}$ Longitude, and 27° Latitude South, in the extreme Parts of Africa, or North-East of the Cape of Good Hope, among the Hottentots.

N. B. The four Oppositions of the Sun and Moon, for the Year, nearest the Nodes, are,

1. May 9, Moon's Latitude, 1° 32'
2. June 8, Moon's Latitude, 1° 4
3. Nov. 2, Moon's Latitude, 1° 23
4. Dec. 2, Moon's Latitude, 1° 20

There can be no Eclipse of the Moon, but when the Latitude is 1° 4'; there would be a simple Contact, between the Moon and the Earth's Shadow, in Case the Moon is in Perigee; but 10' Latitude would be required for this Contact to take Place on the 8th of June.

ECLIPSES for 1770. Calculated from the Palladium-Supplement, by Mr.
WILLIAM CHAPMAN, of Foxton, Leicestershire.

I. Of the Sun, May 25, in the Morning, but invisible at London. The general Appearance as follows.

	Ap. Time at London.	Latitude.	Longitude
	h m s	° ' "	° ' "
Eclipse begins at Sun-rise - - -	10 57 45	0 50 30 N	105 15 45 E
Sun rises totally and centrally eclipsed	11 53 45	3 56 30 N	90 3 15 E
Central and total in the 90th Degree	13 34 3	30 14 10 N	154 25 30 E
Central and total in the Meridian -	13 37 17	30 24 42 N	155 40 15 E
Sun sets centrally and totally eclipsed	15 17 45	13 39 30 N	225 53 45 E
Eclipse ends at Sun-set - - - -	16 13 45	10 34 0 N	210 39 15 E
Margins touch on the Meridian - -	- - -	1 4 59 N	- - - -
Margins touch on the Meridian - -	- - -	65 43 2 N	- - - -

II. (and last) is of the Sun, November 17, in the Morning, but invisible at London. Its general Appearance as follows.

	Ap. Time at London.	Latitude.	Longitude.
	h m s	° ' "	° ' "
Eclipse begins at Sun-rise - - -	7 11 55	3 20 0 N	243 10 15 E
Sun rises centrally eclipsed - - -	8 16 55	0 47 30 N	326 2 45 E
Centrally eclipsed in the 90th Degree	10 8 28	26 16 0 S	25 53 40 E
Centrally eclipsed on the Meridian -	10 11 59	26 32 24 S	27 0 15 E
Sun sets centrally eclipsed - - -	0 2 55	14 43 20 S	94 29 15 E
Eclipse ends at Sun-set - - - -	1 7 55	12 11 30 S	77 33 15 E
Margins touch on the Meridian - -	- - -	7 0 6 S	- - - -
Margins touch on the Meridian - -	- - -	63 28 54 S	- - - -

Mr. Thomas Coruwer, of *Wellingborough*, (instead of the *Solutions* promised us in Page 12 of last Year's *Palladium*) sent us Computations and Representations of the Transit of *Venus*, on the 3d of *June*, 1769, for *Copenhagen* in *Denmark*, Latitude $55^{\circ} 40' 45''$, and Longitude $12^{\circ} 50'$ East from *London*: For the *North-Cape*, in the King of *Denmark's* Dominions, in *Lapland*, Latitude $71^{\circ} 25'$, Longitude 22° East from *London*: For a Place in the *East-Indies*, Latitude $17^{\circ} 30'$ South, and Longitude $149^{\circ} 2'$ East; whither our *Astronomers* (in the *Endeavour*) were sent to observe it. Also a Computation and Representation of the same Transit, for *Archangel*, in *Russia*, Latitude $64^{\circ} 30'$ North, and Longitude $40^{\circ} 30'$ East, from *London*.

Which Calculations and Delineations, with Respect to the radical Places of the *Sun* and *Venus*, were deduced (he says) from Dr. *Halley's* Tables, with the Application of *Parallaxes* founded on the Observations of the *British Astronomers*, *June* 6, 1761, in several Parts of the *Globe*; taking the *Sun's* horizontal *Parallax* $9''\frac{1}{2}$, that of *Venus* $33''\frac{1}{2}$, and of her apparent Semi-diameter $27''$, in each Calculation.

All the Places of *Venus* (on the solar Disk), in the Representations, are from Computations (he says) of the *Altitudes* and *Depressions*, &c. and of *Venus* above and below the *Sun*, for a great many Intervals of Time.

His four elegant and accurate Figures, or Representations, we have not Room for: Though we omit so deserving a Performance (worthy the Encouragement of the Commissioners of Longitude) with great Reluctance.

The general Circumstances computed are as follow.

	<i>Copenhag.</i> 1770, appa- rent Time.	<i>North Cape.</i> Aftern.	<i>East-Indies.</i> Morning.	<i>Archangel.</i> Aftern.
	h m s	h m s	h m s	h m s
Beg. 1st Contact	8 4 13	8 41 17	5 21 58	9 55 44
Central Ingress	8 12 22	8 49 44	5 30 25	10 3 54
Immersion - -	8 21 16	8 58 14	5 39 16	10 11 38
	vis. 10.17.20	vis. 10.17.20	vis. 10.17.20	vis. 10.17.20
Ecl. & vis. Conj.	11 2 41	11 40 0	8 14 15	0 54 47
Eclip. Conj.	11 25 13	12 1 47	8 34 52	1 17 5
Middle - - -	11 25 13	12 1 47	8 34 52	1 17 5
Emersion - -	2 29 40	3 5 24	11 27 26	4 21 9
Central Egress	2 38 34	3 13 47	11 36 32	4 30 0
Last Contact	2 46 46	3 22 20	11 44 50	4 38 2
	vis. 10.17.20	vis. 10.17.20	vis. 10.17.20	vis. 10.17.20
	Morning.	Morning.	Morning.	Morning.
<p><i>Q</i> comes on a little to the East of Vertex, descends in a parabolic Curve to $\frac{1}{4}$ vert. Rad. then to above $\frac{1}{3}$ of Sine 45° fr. that Rad. to Mid. going off the West Limb about 360 from the Vertex.</p> <p><i>Q</i> comes on about 180 East of the Vertex, and descends in a circular Curve above $\frac{1}{3}$ of the vertical Radius, then to $\frac{1}{4}$ Sine 40° fr. that Rad. to Mid. goes off 500 West Limb fr. the Vertex.</p> <p><i>Q</i> comes on about 400 East from the lower Limb, ascends in a Curve (like a Fire-hook) to two-thirds fr. vertical lower Rad. of Sine 200 at Mid. goes off very curved 150 E. hor. Line below.</p> <p><i>Q</i> comes on 250 East of the Vertex, and descends in a circular Curve to one-third of the vertical Radius; she goes off near the Middle, 45° from the Vertex on the West Limb.</p>				

N. B. Between *Venus's* Setting at *Copenhagen* and the ecliptic Conjunction, $9^h 49^m 47^s$.

The *Transit* of VENUS, and *Eclipse* of the Sun, following, the next Morning, were observed at the Royal Observatory at *Greenwich*, as follow, by seven Observers, for executing the OFFICE of *Astronomer Royal*; Mr. *Maskelyne* being first Observer, or President.

TRANSIT of VENUS, observed June 3, 1769.

Observers.	External Contact.			Regular Circumferences in Contact.			Thread of Light completed, or internal Contact.			Telescopes used.	Magnifying Power.
	h	m	s	h	m	s	h	m	s		
<i>Newil Maskelyne</i>	7	10	58	7	28	31	7	29	23	2 f. Reflector	140
<i>Malachi Hutchins</i>	7	10	54	7	28	47	7	28	57	6 f. Reflector	90
<i>W. Hirst</i> - -	7	11	11	-	-	-	7	29	18	2 f. Reflector	55
<i>J. Horsley</i> - -	7	10	44	7	28	15	7	29	28	10 f. Acromatic	50
<i>Samuel Dun</i> -	7	10	37	7	29	28	7	29	48	3½ f. Acromatic	140
<i>P. Dollond</i> - -	7	11	19	-	-	-	7	29	20	3½ f. Acromatic	150
<i>E. Nairne</i> - -	7	11	30	-	-	-	7	29	20	2 f. Reflector	120

So great a Difference, ($57^s = 14' 15''$), as between $7^h 10^m 37^s$ and $7^h 11^m 30^s$, having happened in observing, how can the Sun's horizontal Parallax be had to 1 Second of a Degree? Which Difference creates a Difference of a Hundred or two Thousand Miles, in the Sun's Distance from the Earth. — But our accurate Astronomers propose to determine the Sun's horizontal Parallax to the utmost Precision: It is hoped to Thirds or Fourths of a Degree.

N. B. The silver Thread, observed about Venus, at her inner Contact, is now to be seen at a Lecturer's Shop in Fleet-street.

ECLIPSE of the SUN, observed on Sunday Morning, June 4, 1769.

Observers.	Beginning.			Greatest.			End.			Telescopes used.	Magnifying Power.
	h	m	s	h	m	s	h	m	s		
<i>Mr. Maskelyne</i>	18	38	54	19	29	31	20	23	30	2 f. Reflector	90
<i>Mr. Hutchins</i> -	18	38	59	19	31	17	20	23	35	* 3½ f. Acromat.	150
										† 6 f. Reflect.	90
<i>Mr. Dunn</i> - -	18	39	9	19	31	21	20	23	33	3½ f. Acromatic	140

Eclipsed Parts of the Sun, $16' 16''$, or 6 Digits, $11', 62$, on the Northern Part of his Disk.

OF THE ADVANTAGE OF ENEMIES.

1. As Savage Beasts of the *Wilderness* furnish Men with many convenient Necessaries, so the Envy of Men, if prudently managed, may be turned to Advantage. Fire, when too near, scorches and gives Pain; but being kept at a proper Distance, warms and enlivens; bestowing (like the Sun) the good Effects of Light and Heat!

2. When an Enemy reproaches you, look on him as a friendly Relater of what none else (not even a real Friend) would have communicated, and what our Partiality, in our own Favour, would not suffer ourselves to discern.

3. Reproach

3. *Reproach*, or Blame, from an Enemy, may be applied, as a *precious Balm*, to cure the Wounds of our *Reputation*, from our Folly and Indiscretion, or from unruly Passions and Appetites.

4. As through our *Enemies* we come to know Truth, we should never, otherwise, have heard of; so we should be *reconciled* to their Spleen; because, through the Discoveries they make to us, we are enabled to atone for the Errors of past Conduct, and guard our Actions for the future.

5. *Disgrace*, from our *Enemies*, brings *Caution* for the future.

6. When a *false* Friend becomes our Enemy, we learn to be more cautious whom we repose *Confidence* in, or make a *Friend* of, for the future.

7. It is of greater *Advantage* to be told of our *Faults* by an Enemy, than to be *cajoled* and *flattered* into Pride, Carelessness, and Conceit of ourselves, by a *pretended* Friend.

8. As *Vultures* pursue corrupted and noisome *Carcasses*, wanting Perception of what is *sound*, so our *Enemies* lie in wait to catch at our Failings, and spread them abroad; bringing us this Advantage.

9. From the Reproaches of our *Enemies* we learn to lead more blameless and inoffensive Lives; to turn our *vehement* Desires into earnest Endeavours, in Defence of ourselves; to curb our tumultuous and disorderly Passions; to fill our Minds with sober Thoughts and Moderation; and to form strong *Resolutions* to steer a wiser Course.

10. As Nations love *Peace*, and study to preserve it, after they have been long harassed by the Fatigues of War, so we are brought to mend our Lives, by the Dread and Awe of our potent Enemies; for we are taught to condemn no Man for common Frailties, but to behave *courteously* to all. And, through the Cause of their Enemies, Men may *gradually* be drawn into good Habits, and use themselves to be less offensive and hurtful to any, till their *Conduct* and *Behaviour* towards all becomes generous, respectful, and polite.

11. By an unblameable Life and Conduct, you wound your Enemies with the Darts of their own *Spleen* and *Envy*, first thrown at you, that rebound with redoubled Force on themselves. For *Diogenes*, being once asked how a Man might best be a Match for an Enemy, answered, that the greatest *Mortification* you can give him, is, to *excel* him in all worthy Accomplishments, so as to gain a superior Esteem from your *Example*, *Conduct*, and *Morals*; to be openly what you seem, without being a *Hypocrite*.

12. *Enemies*, in some Cases, are equally to be ranked with *Friends*, for the Benefits we receive from them: For *Antisthenes* observed, that if a Man would lead a secure and unblameable Life, it is necessary that he should have *ingenuous* and *honest* Friends, or *very bad* and *inveterate* Enemies; because the former will prevail with him to avoid *Enormities* in his Life and Conduct; and the latter, by their *ill Words* and *Invectives*, will make him *cautious* how he offends.

13. Enemies are of *Advantage* in making us exert our good Qualities, so as to shine the *brighter*; which, without them, might lie hid in the *Embers*, and give no Light. And thus every *Effort* of an Enemy's Malice is turned to Benefit, by defeating his Purpose through your own superior Merit, made to *appear*.

14. As the *reverberated* Sun Beams greatly afflict *weak* Eyes, so the *Calamities*, or *false Reports*, raised by our Enemies, when reflected back by *Truth*, are very vexatious and troublesome to the *Misrepresenters*, when found out in their Aspersions.

15. When *Flattery* and friendly *Counsels* are asleep to our Failings, our Enemies are kind in *rousing* us, by rubbing the Eyes of our *Understanding*.

16. *Telephus*,

16. *Telephus*, when he could find no Surgeon to cure his Wounds, applied the Rust of his Enemy's Spear, with Success.

17. The prudent Man should fix his Attention on the Object levelled at, and not at the Leveller; for, as wholesome Remedies are extracted from venomous Animals, the Poison he sees conveyed, with Intent to destroy the slandered, will be of Advantage in curing his Wounds: For, as he that designed the Death of *Prometheus the Thessalian*, instead of destroying him, preserved him, by pricking an Impostume, and discharging the Corruption that threatened his Life, when he was given over by his Surgeons; so his Enemy performed a Cure beyond the Surgeon's Art: as rough Reprehensions from Enemies cure particular Distempers of Mind, that were either not known, or neglected.

18. When your Enemies object to Crimes against you, of which you are ignorant, you may thereby take Heed to avoid those Things that are unjustly attributed to you.

19. It is a Matter of as much Concernment to any One, when he is slandered by an Enemy, to live so as to avert those Slanders, as it is to get the Spots out of his Cloaths, when they are shewn him.

20. Sometimes it is necessary to have an Enemy for your Tutor, who will instruct you in those Things gratis, of which you were intirely ignorant before.

21. Enemies oftentimes see more Things, relating to our Welfare, than our Friends: For *Plato* used to say, that Esteem and Love are blind; especially in discerning the Things esteemed and beloved. But Spite, Malice, Ill-will, Wrath, and Contempt, are very inquisitive and quick-sighted, and spread abroad what they see and hear.

22. To keep a Guard upon the Tongue is no inconsiderable Part of human Wisdom and Discretion.

23. Where Anger and Rancour prevail, the Mind lies open and defenceless, exposed to the View and Advantage of a merciless Enemy.

24. The Tongue is a double Instrument, of Good and Evil, and produces the greatest Benefits, as well as Mischiefs, to the owner, according as it is rightly or wrongly employed: And therefore those who live in Society cannot be too careful to keep it within its proper Boundaries.

25. To suppress and exclude Passion, on a Provocation, is a Conduct of sublimest Prudence; seeing you then maintain the Post of Reason and Honour, and are impregnable to vulgar Impressions.

26. Of all other Conquests, it is the greatest Acquisition to rule with Discretion over ourselves: For the Triumph of Free-will is a greater One than the greatest Conquest than can be made by the Sword.

27. He that gains a victory over himself (says the Philosopher) is greater than he who conquers Kingdoms.

28. *Aristotle*, finding *Alexander* (his Patron) outrageously angry with one who had offended him, said, on the Occasion, *I will that thou this Day be a greater Conqueror than ever thou wert heretofore*. When *Alexander* asking him how? the Philosopher replied, *By subduing and triumphing over your Passion, your most formidable Enemy*.

29. One great Advantage to be gained from your Enemy is, by your Silence, to put his Malice to the Rout. When, seeing himself at a Distance, he will be more at Peace with himself, and less disturbing to others.

30. The great Talent of Silence, as *Hippocrates* has physically observed, does not only extinguish Thirst, but bears up against all Slander, with the Constancy of *Socrates*, and Courage of *Hercules*; who were quite unconcerned at any Thing others said or did,

31. It is not only a *Christian* Principle, but a *politic* one, to pay the Respect to an *Enemy*, he deserves; for to give an *Enemy* his *Due*, is to bestow Honour on yourself. That whenever you shall have Occasion to correct or censure his *Faults*, you will obtain the more Credit for what you say: Because, where *Impartiality* appears, your Censure will be looked upon as Justice, and as an Abhorrence to his *Vice*, and not to his Person.

32. To speak well of an *Enemy*, when he deserves it, will gain you Esteem from Men of Justice and Honour.

33. It is manly and brave, in our Differences with Mankind, to shew ourselves generous and just, as well as Detesters of *Falseness*.

34. It is *praise-worthy* to moderate and correct our *despightful* Passions; that, in all our Conversations we may appear open-hearted, without seeking to deceive or hurt one another, in any of our Undertakings.

35. *Scaurus*, a professed *Enemy* to *Domitius*, was applauded for sending a Servant of his bound to him, for offering to betray his Master's Secrets.

36. When we enter the *Lists* with our *Enemies*, let us not contend for Victory, at any Rate; but for true Glory and lawful Empire.

37. Never be troubled at the Advantages gained by a Friend or *Enemy*; as *Themistocles*, in Emulation, complained that the glorious Victory, gained by *Miltiades* at *Marathon*, would not suffer him to sleep.

38. Some *Enemies*, like *Insects*, escape Observation, till they are magnified by Notice; and therefore are but neglected, to die of themselves, like *Insects* of the Season.

39. To *Enemies* in Sight it may sometimes be as necessary to brush them, as the Flies with a Flapper; the Horse taking his Tail on the like Occasion.

•• These are the Maxims of political and moral Conduct, drawn from Experience and Observation of the Passions of Mankind, and their Effects upon civil Society. But if Men could be prevailed on to steer their Course by religious and Christian Principles and Conduct, they need go no farther than the Old and New Testament for Examples of every Kind of Conduct necessary in Life, for procuring Happiness here and hereafter. The Bible, therefore, may be looked upon as the divine RULE, to be consulted on all emergent Occasions concerning human Conduct; since it is the History of God's Providence in the Government of Mankind.

OF THE ADVANTAGES TO BE GAINED FROM ANY COMPANY.

1. As the Bee sucks Honey from every Flower, (whether growing in the Field, or in the Garden,) from which the Spider also extracts his Poison; so a provident Man, let his Company be what it will, may gain Advantage from it; while the indiscreet and improvident Man is worsted by most Conversation.

2. Wise Men improve themselves from contrary Qualities: For when Vice beats up for Recruits, as soon as her ugly Form is discovered, instead of enlisting, she frightens her Attendants, who fly to Virtue's Standard for Refuge, and immediately take on in her Corps.

3. Every Man learns to correct his own Faults by seeing how ugly those Deformities appear in others.

4. A drunken Fellow, wallowing in a Kennel, would make us believe, at first Sight, that *Circe* has transformed him into a Swine; as the Soldiers of *Ulysses*, in *Homer's* Fables, were transformed, on a like Occasion: Being a Lesson of Instruction, in *Homer*, against such Bestiality.

5. Cholera,

5. *Choler, Passion, and insolent Pride, by being seen, correct those Deformities in others.*

6. Some have imagined, that cruel *Commanders* will be transmigrated into *Cart-Horses*, and whipped by *Carmen* to their Duty.

7. Some otherwise have imagined, that the rich popish *Clergy*, who fleece the poor and distressed, as well as the rich and opulent, (*preaching up Charity, and doing none,*) will be transmigrated into *Beggars*, to stroll the Country for a Livelihood.

8. Others have imagined, that the great *Whore* of *Babylon*, dressed in *Scarlet*, will be transmigrated into a poor *Street-Walker*, and prostitute herself to every mean *Fellow* for a Livelihood.

9. Others, again, have imagined, that the Part of Mankind, who prostitute honest Principles, for *Gain* to themselves, and to the Disadvantage of others, will be transmigrated into *Robbers* of different Degrees and Denominations.

10. That *Lawyers* will be transmigrated into false *Witnesses*; and that every one who has dishonoured his *Profession*, will be transmigrated into a Being of a *Class* the most worthy of his Demerits.

11. Reasonable Men mend by looking at *Vice*; but *Profligates* grow the worse for the Sight.

12. As neither *Example* nor *Precept* (except in Matters of Religion) can be an absolute *Guide* for any Man's Conduct, it must be an experienced and practical Judgement, in the Knowledge of Men and Things, that must direct him in the *Doublings* and *Turnings* of the World.

13. Since, in the State of *Man's* Life Events are casual for the future, it is impossible that any Man can leave to his *Successors* infallible Rules to direct them, because he knows not how Times and Things may alter.

14. In some Things Men will fall short of those who went before them; in others they will go beyond them: Such imperfect Beings are Men!

15. As the industrious *Bee* gathers *Honey* from different Flowers, so (like Men gathering Fruit from all Kinds of Company) she completes the Composition, by blending together the *Honey* gathered from several.

16. It requires Care, in *Conversation*, and Choice of Acquaintance, to distinguish the real and useful, from the counterfeit and worthless Sort. This is done by observing every good and bad *Talent*, without Dislike or Prejudice to any Man.

17. As Men cannot pass through the World, without meeting *Vice* in their Passage; so when they meet it, they should make the best Use of it; that they may avoid being intimate with, or infected by it.

18. The Example of good Society may be improved to the doing some future Good.

19. When we fall into *bad* Company, we may from thence learn where the *Rocks* lie that we are to shun.

20. As the *Mariner* makes every *Wind* serve him, for sailing towards his intended Port, even amidst *Dangers*, *Difficulties*, and *Currents*, when he has Sea-Room; so a prudent Man will navigate himself into the Harbour of Safety and Happiness in any Company.

21. As *Embassadors* from foreign States avail themselves of all *Advantages* they are sent to take, so *Mankind*, sent hither to avail themselves of the Happiness of a future State, should gain as much Empire on that Dominion as they can: Who, like the *Physicians*, by correcting *Poison*, should make it medicable for the Mind's Health; which of its own Nature, and without such necessary Correction, is destructive to the human Being.

21. The Imperfections and Depravities of the present human State, with all the different Modes of Pleasure and Pain considered, are such, that the best

and wisest human Being may, with Reason, wish for a Translation from this to some other Orb, or Situation of Being, among the *innumerable Worlds*, revolving in *infinite Space*, either visible or remote from Sight; in Hopes that there is some State amongst them to be found, of more *substantial* and permanent Happiness than what, from Experience, can be enjoyed upon this our contracted Spot of Earth.

22 If the *Multiplication* of our Faculties of Perception, and the Enlargement of our *Understanding*, connected with a *Substance* fitted for such a Change, (not affected by *Hunger, Thirst, Heat, Cold, Pain, &c.*) could be ours, our enjoyed Privilege, without a Possibility of a future Death, or a Falling from that State, still advancing in Perfection, to what a Pitch of Happiness (O INFINITE and SACRED CREATOR!) shall we then be arrived?

CHANGE OF ACQUINTANCE. By OBSERVATOR.

1. *Acquaintance*, or *Friendship*, is dissolved, like a broken *League*, or a Cloud by the Winds, when the Conditions are forfeited.
2. *Acquaintance*, founded on Self-Interest and selfish Views, changes with Advantage, and new Prospects.
3. The *Aggressor*, in *Acquaintance* or *Friendship*, first breaks the *Ties*.
4. There is no Right of future *Acquaintance* founded in the *Custom* of present Intimacy.
5. Choice, or Liberty, will warrant an Alteration in *Friendship*, or *Acquaintance*, on a sufficient Cause assigned.
6. Esteem is forfeited in *Friendship*, as well as in *Love*.
7. *Gratitude*, entailed by a generous *Benefactor*, should be acknowledged as a *Debt* due, (though never discharged,) for the weighty Obligations received.
8. To forbid *Gratitude* is to forbid *Humanity* and *Duty*.
9. *Praise* for a small Accomplishment is often founded on Fear, is a *Tribute* of Flattery, and, at best, to be suspected of *Sincerity*, when *Actions* do not concur to prove the Heart.

THE GENERAL BENEFACTOR.

Receiver and a Giver of Applause,
 And Vindicator of a diff'rent * Cause;
 Forgiver and Rewarder of Offence,
 (A bright Example of Benevolence!)
 Placer of Opposites so near each other,
 That each may be the other's Christ: an Brother.
 Making Obscurity and Meanness bright,
 Bringer of smallest Objects † into Light;
 Yielding to Friends and Foes, by Turns, Delight:
 Diffusing boundless Favour diff'rent Ways,
 As genial Sol. emits enliv'ning Rays.
 Commander of Respect and Gratitude;
 Whom from my Heart I never can exclude!
 Whose Benefits I never can forget;
 And therefore never shall be out of Debt.

PHILO-BONITAS,

* Shining on the just and unjust.

† Like the Atoms in the Sun-Beams.

THE PARSON AND SEXTON, A Tale. By Philo-Sinceritas.

The *Parson* of another Town
 Had made a *Sexton's* House his own.
 The *Sexton*, in as free a Mood,
 Call'd at the *Parson's* when he wou'd.
 The *Sexton* pen'd the *Sermons* fair
 The *Parson* brought him, or a *Pray'r*,
 He shew'd the *Sexton* private Letters,
 From *One* who had defam'd his Betters.
 In short, their Greatness grew so fast,
 That some presag'd it could not last.
 The *Sexton* paid the *Foe* Respect,
 And soon the *Parson* does neglect;
 In Hopes that he should gain his End,
 And *Stranger* prove the better Friend,
 But when the *Sexton* tries and finds
 He did not answer all Designs,
 He lets the *Parson* understand
 He is his *Friend*, — and gives his *Hand*:
 The *Parson*, hating double Part,
 Refus'd him both his *Hand* and *Heart*.

MORAL.

The *Parson*, to no one confin'd,
 Can *Sextons* choose of diff'rent Kind,
 Who by a *Principle* are sway'd,
 And not by *Interest* in Trade;
 Such as by *Friendship* will be brib'd,
 Prescribing, and to be prescrib'd.

ON FALSE FRIENDS AND FRIENDSHIP.

In *Friendship* 'tis the same as 'tis in *Love*,
 While the true *Object* does our *Passions* move;
 Excluded from the *Heart*, by *Faithood's* Pain,
 Nothing the *Friend* or *Lover* can regain.
 How base is *Friendship*, when put up to *Sale*,
 Where *Interest* and *Ingratitude* prevail,
 And *selfish* Ends preponderate the *Scale*!
 Esteem, how vile, when the *false* *Heart* is sold,
 And *Kindness* bought! — The Bane of young and old!

PHILO-CONSTANTIA.

ON BEAUTY AND FASHION. By Philo-Palladium.

(See *Gent. Diary*, 1769, p. 26, 27.)

I.

BEAUTY is but a fading Flow'r,
 And *Dress* is but a Cheat;
 Would *Women* gain o'er *Man* a Pow'r,
 Good Sense and Worth should meet.

THE BRITISH PALLADIUM, or

II.

Good-nature far surpasses Face;
Industry we approve :
Discretion never fails to please ;
And Modesty we love.

III.

The Mind improv'd we all admire,
Without the Toilet's Art : †
False Ornaments but damp Desire,
And loose the Lower's Heart.

† The present female Head-Dresses, so far from being ornamental, shew the Inside Furniture of the Mind to be similar to the Fritzzle on the Outside.

RULES found in the Study of a periodical AUTHOR.

1. Select the best Things, and improve what is useful.
2. Reject immoral and indecent Subjects.
3. Promote Truth, and suppress Error.
4. Determine Place of Connexion.
5. Extract Truth from the Dross of Words, scattered in a Multitude of Books ; as Gold is selected and refined from its Ore, scattered abroad in the Mines.
6. Truth is smothered by many, but made conspicuous by few and expressive, Words.
7. Eloquence (by Metaphor, Similitude, and Allusion) strikes like a Likeness in the Glass.
8. False Metaphor and Allusion is similar to Painting in Disproportion ; or to giving a wrong Likeness.
9. The Ornaments of Language should be striking, while they convey a strong Likeness of the Thing, or Things, represented.
10. Never sacrifice Truth to Prejudice.
11. Do no Injustice.
12. Treat an open Enemy with Generosity ; but a treacherous and concealed one as he deserves.
13. Moral Rules and Maxims, drawn from Experience, will direct Men to the Port of Happiness, as Ships are guided through a tempestuous Ocean to a safe Harbour, by the plain and sure Rules of Navigation.

ADDRESS to BRITISH YOUTH at School. By Philo-Palladium.

Pallas and Prudence all your Steps should guide,
And still from Meanness ever turn aside.
Though Understanding marks the Youth and Man,
If you're not as you would, be what you can.
Good Habits are by Custom soon acquir'd :
The bad are hated, and the good admir'd.

The Duty of MAN inferred from the WORKS of CREATION ; or NATURAL RELIGION delineated. By PHILO-PALLADIUM.

Contemplating the infinite Variety and Grandeur of the Works of Creation, especially those Works which come most under our Observation, that concern the

the Sciences to know, will the most exalt our Ideas of the Creator's Greatness and Goodness; and the most excite our Gratitude and Homage to the Author of all Things, for the Powers, Faculties, and Benefits we enjoy. To understand which, is the proper Subject of moral Philosophy, and of human Happiness. In the Dependence, Connexion, Scheme, Union, Harmony, and Preservation of the Works of Creation is manifested the Duty of Man, in Respect to the Creator of all Things, and the Individuals of Society.

Men, like the Plants, first received their Being upon this Spot of Earth, whence they first knew Sensation, Perception, Memory, Reflection, Reason, and Judgement, and all that their Faculties comprehend. Who were here first conscious of their exalted Stations above all other created Animals, were likewise made conscious of their Power to do Good or Hurt, in Respect to each other's Pleasure or Pain. Whence it is inferred, that Men were created as Instruments or Agents of the divine Providence, to obey his Will, and execute the Purposes of Creation, according to the Laws of civil Government, (dictated and inspired by God,) under which they are placed; by that divine Providence evidently presiding and ruling over Kings and Kingdoms.

Men, it appears, were created in high and low Subordination, under the divine Power and Influence, and the Direction of one another, to act in mutual Concert for each other's Dependence and Happiness: In which a Deviation from the Laws of Nature, and the general Good of Creation, can never be supposed, to the Disorder, Confusion, or Destruction of any Part thereof, which would be to subvert and destroy the Peace, Order, and Harmony of the Whole. That since the Beauty, Order, and Good of the whole Creation is evidently supported and preserved by the infinite Wisdom and Power of an almighty Creator, he must be virtually present every where, by his Essence, to direct and influence the Whole; or, by his delegated Powers and Commands to his Ministers and Agents, in their several appointed Stations and Subordinations, amidst innumerable revolving Worlds, in the infinite Space, who are directed to regulate and govern under him.

In which several appointed Stations and Gradations of Power and Influence, every intelligent Being created should co-operate to the great End or Design of the Whole: Wherein the inanimate and sensitive Parts of Creation, with the whole Species of Animals, governed by the Laws of Nature and Instinct, never deviate: And Man, and other Intelligences, by their Freedom only, can fail of their Duty; like the lesser Wheels and Movements of a grand Machine, always going true to answer one main End, except disturbed and made to go wrong, by falling into the Hands of wilful Misguiders.

Hence it also appears, that the first Cause of infinite Nature, and of Nature's whole Scheme, could have no Beginning; therefore the Cause must be infinite in Power and Wisdom, which must be God; who therefore must exist necessarily, (independent of Creation, or of any Power or Being,) and therefore can never cease to exist, from Eternity to Eternity; without a Possibility of ever changing his Existence to Non-entity. Who, being able to do all Things possible and consistent with his own Attributes, Glory, and Perfections to do, yet cannot destroy himself.

Who is the Fountain of all Life, Wisdom, Power, Glory, Perfection, and Happiness, as well as the Cause and Support of all created Being, of all material Forms, and of every other Substance whatsoever, that can be seen or comprehended: In and by whom all Things perpetually subsist; whose Attributes and Perfections are infinite and incomprehensible.

Hence it is inferred, that all those intelligent Beings, holding their Existence and Degree of Excellence under him, who are conscious of their Freedom to act or forbear to act, and of being subject to his Laws and Protection,

section, are by that Consciousness bound to obey and perform the Duty required of them, in each particular superior or inferior Station of Life, in the Scale of subordinate intelligent Being. And thence it is farther inferred, that those intelligent Beings, who depend on his Power and Goodness in every State, should not only, in Duty, *submit to* and obey his Laws, but are bound, in Gratitude, to be thankful for his Benefits received, with humble Prostrations, Worship, and Adoration. Who, if they expect to be made farther happy, or continued in the Happiness they at present enjoy, through his boundless Favour and Bounty, should solicit the Continuance of his Favour, Influence, and Support, here and hereafter.

Hence it will follow, that Mens religious Duty is founded in the Practice of Morality, depending on a *rational* and *natural Religion*, (and not on an enthusiastic Superstition,) improved by *true Faith* and *Revelation*, in Praying, Homage, Worship, Adoration, Thanksgiving, and soliciting Favour of the Giver of all Benefits, and Supreme of all Beings.

This natural and moral Religion, improved by true Faith, chiefly consists in the *Love of God and Man*; and *doing to others as we would be done unto*; being (as we are told by the great Example and Saviour of Mankind) the Sum and Substance of the *Gospel*.

For he who does *Good* or *Hurt* to others, sets a forcible Example for others to do the like Good or Hurt to himself. Whence, on the one Hand, proceed Friendship, friendly Alliances, Kindnesses, and the several Benefits, from doing Good to others, that happen to Men linked in Society; as, on the other Hand, proceed Quarrels, Hatred, Malice, Effusion of Blood, and all the Mischiefs and Evils, consequent from doing Hurt to others, that befall Mankind, in their own, or from other Nations: Of which the divine *Socrates* (who was an Example and Sufferer before *Christ*, for shewing Men their Errors of Action) gave us a clear Demonstration, as to the Effects of moral or immoral Conduct.

Against Mankind's *Reason*, and sober Approbations, the several implanted rebellious and unruly Passions and Affections are observed to be continually making War, and causing their Unhappiness and Misery. To oppose and conquer which *Passions* and *Affections*, is the Work of a Philosopher and a *Christian*, and of Parents, by an early Education, to perform.

From Nature's Chain whatever Link you strike,
Tenth or ten thousandth, break the Chain alike.
Aspiring to be Gods, if Angels fell,
Aspiring to be Angels, Men rebel:
And who but wishes to invert the Laws
Of Order, sins against th'eternal Cause.

POPE'S ETHICS.

DIVISIONS in RELIGION, since the TABERNACLE of GOD.

Sir *Walter Raleigh*, in his History of the World, Chap. 1, Page 267, to 269, describes what a prodigious Army was appointed to guard the *Tabernacle* of God, moved from Place to Place, with the *Ark* and *Sanctuary*, to whom it was given in Charge.

Two and twenty Thousand Persons were dedicated to the Service of this moveable Temple, or *Tabernacle*, for transporting it from Place to Place, consisting of the most beautiful Workmanship, and of the most expensive Vessels and Ornaments: Whereof 8580 Persons had particular Charge. And so great was the Reverence then paid to the *Worship* of God, that no *Levites* were suffered to approach the Temple, but were put to Death in attempting it: And all *Pagans* and *Idolaters* were kept at a Distance by

by the surrounding Army of 603550 Persons, on the *Peril* of being put to Death also.

But since that Time, and the Time of *Christianity*, Religion and religious Worship, practised by *Seſtariffs* of different Denominations (some gifted with *Inſpiration*, the Spirit of Prophecy, and Revelation from God) have ſprung up into *various* Denominations and *Modes* of Devotion; in ſuch a *Variety* of Forms, that the new Teachers, *Prophets*, and Guides to Salvation, have, from their fancied *Principle* of exalted Piety, above that of other Men, turned God's Worship into *Barns and Fields*, and driven it under *Hedges*, for their private Emolument, againſt the Honour of God's true Worſhip, and the Rules of the regular Clergy.

From ſo many *contradictory* Opinions, taking Root againſt the eſtabliſhed Religion of a Country, and ſo many *inconfiſtent* Doctrines of Faith embraced, (for which the Followers plead an Act of *Toleration*,) the true Religion is daily dying away, without any certain Faith, or ſettled Opinion to go by, among thoſe who call themſelves *Chriſtians*.

From theſe ſeparating *Causes* a Confuſion of Faith, and Diſunion of Minds, follow, with the Decay of the Health and Strength of a Community: That, in Time, we may expect to ſee as many Sorts of Religions, among Diſſenters and Separatiſts, as there are different Pariſh Churches; while ſuch *Diſſenſions* of Opinions are naturally productive of Diſputes and Differences among Men, as they are *ſubverſive* of all true Religion, Harmony, and wiſe Government.

Modern TABERNACLE PIETY.

I.

To ſerve his God, a *Whitfield* Saint
Went forth three Times a Day;
Who bid *Church-Sinners* to repent,
And hear the *wiſer* pray.

II.

But when this *Saint* from Pray'rs withdrew,
He was inclin'd to *Evil*;
And *Spite* inſtead of *Right* would ſhew,
And often ſerv'd the *D—l*.

III.

The *Pope*, though loſt his *ſovereign* Pow'r,
Yet Popes on Popes ariſe;
Pope *Wh—d* and his Brother Popes
With *new Lights* blind our Eyes.

IV.

Now *Sanctity* o'erſpreads this Realm,
By *Aſſeſſation* ſham'd:
Prophets ſpring up to be our Guides,
Who tell us we are *d—d*.

V.

Theſe *Prophets* their new Doctrines teach,
By Act of *Toleration*;
And each *new Light* ſupply'd by Grace
Is boated *Inſpiration*.

VI.

A *Cobler* or a *Taylor-Saint*
The *Scripture* Text explains;
Who *Profits* aſk of *F—ls* that grant,
And ſhare their *pious* Gains.

Mock-Prophets and Mock-Saints arise,
Who heav'nly Gifts pretend:
But surely, by such Mockeries,
This World is near its End.

PART II.

ANSWERS to the *ÆNIGMAS* in last Year's PALLADIUM.

- | | | |
|--------------|---------------------|----------------------|
| I. ETERNITY. | IV. A KING'S CROWN | VII. The BIBLE. |
| II. LOVE. | V. A LADY'S FAN. | Prize, The Letter A. |
| III. SNUFF. | VI. A WHEEL BARROW. | |

|| Though some say, A CRADLE, in which a young Lady is rocked.

Mr. Haugbar, of Morpeth, answered most of the *Ænigmas* in Rhime; Mr. George Lodge answered them in Prose; and also Mr. William St. John, who answered the Prize.

Mr. Lyon, of Margate, answered the Prize-*Ænigma*.

Mr. John Bailey, of Middleton, in the East Riding, Yorkshire, answered the Prize, and some other of the *Ænigmas*; who observes, that Cadmus brought 16 Letters from Phœnicia to Greece, and therefore the Letter A, Mr. Swift's Favourite, came among the rest.

Prize-*Ænigma* answered by Miss Stow to Mr. Osgood,

Since Dreams so much your Fancy sway,
In DREAMS you'll find the Letter A.
Osgood, if Dreams can do you Good,
Dream you are wed — I wish you wou'd.

Master Thomas, of Mr. Moore's School, answered most of the *Ænigmas*, and also the Prize.

Mr. Alexander Rowe answered the Prize-*Ænigma*, in Verse.

Mr. James Brown Ashton answered the Prize, thus.

When a Child on the Horn-Book first opens his Eyes,
He cannot miss finding out Billy Swift's Prize.

Otherwise, by Miss Polly Ashton, of Swinethorpe,

Ah, Billy! what no farther got than Great A?
How long will it be ere you Ovid can say?
'The next Time I meet you, I'll give you a Smack,
'To make you get forward, and tickle your Back.
If this is the Pace that in Learning you go,
'Tis certain you never will wed Polly Stow.

Mr. James Hartley, of Sowerby-Bridge, answered all the *Ænigmas* in Verse. Mr. John Bailey, of Middleton, Yorkshire, answered *Ænigma* II. in Imitation of the 20th *Idyllion* of Theocritus, [*Cupid turned Thief*]; addressed to Miss Stow; which we have not Room to insert.

Mr,

Mr. Jos. Sherwin, of Alkington, near Derby, answered the Prize Ænigma.

All the ÆNIGMAS answered by Miss Polly Stow, of Stow, near Gainborough, Lincolnshire. In a Complaint for the Loss of Damon, in the late War.

O War, thou direful Monster, Sire of Crimes !
 Thou hated Offspring of barbarian Climes !
 Must I, oppress'd, no more my Damon see,
 Lost, through thy Cause, to all ETERNITY ?
 Kings wear their CROWNS, and Subject-Realms adore ;
 But I my Damon must behold no more.
 Farewel his Flocks, fair Fields, and feeding Kine,
 That once his Care engaged — as he did mine.
 Alas ! he's gone, ye Hills and fragrant Flow'rs,
 Ye vocal Woods, and once ye blissful Bow'rs !
 Farewel those BEAUTEOUS Scenes I did behold ;
 Now quite forlorn, where he his Flocks did fold !
 Farewel, my Lute, and all our tender Loves,
 That tun'd our Joys, and fill'd the sacred Groves !
 My FAN and SNUFF-BOX now are thrown aside :
 O let me mourn, like Damon's mournful Bride !
 The SCRIPTURE says, the dearest Friends must part :
 O Grief, suppress my Sighs, and burst my Heart !
 With thee no more I walk the winding Shade,
 Where thou thy LETTERS on fair Virtue read.
 The BARROW's Noise my Ears no more shall stun,
 And for dear Damon let me die a Nun :
 Or let me pass my Life in some lone Vale,
 Where Ravens croak, and Owls portentous wail !
 There let me waste away this Life of Woe,
 Nor pitying Friends one tender Tear bestow.
 My glorious Day, Britannia, now is o'er :
 Since Damon's lost, his Polly is no more !

5, 3

7

Prize

6

Prize-Ænigma answered by Mr. George Lodge, late of Newmarket, but now of West-Ham, Essex.

To Idleness a Foe, the Hand of Heav'n
 (Whilst on this earthly Sphere) to each allots
 A just Employment, revolving Moments
 To improve — To th' Infant Mind A, B, C,
 Learning's premier Step — Succeeding Years
 (Grateful Duty !) the tender Breast employs ;
 And Learning still, as riper Years increase.
 — Next Science (Pursuit delightful !) youthful
 Care requires — Then Manhood Duty's Theory
 Into Practice turns, in Life's varied Call.
 Thus of Man it is requir'd to pass
 The mortal Stage, and well improve his Time,
 Till Death the awful Summons gives, to bid
 This World Adieu, and fly to Bliss eternal.

D

ANSWERS

ANSWERS TO THE QUERIES IN LAST YEAR'S PALLADIUM.

I. *Quere 206*, answered by Mr. *James Brown Ashton*, of *Lincoln*.

The first *English* Prince (that *History* gives any certain Account of) that was crowned with a *Diadem* of pure Gold, was *Alfred the Great*; who, after he had entirely routed the *Danes*, went to *Rome*, and caused *Pope Adrian II.* to set a Crown upon his Head. This truly magnanimous Prince began his Reign in the Year of the *Julian Period* 872.

II. *Quere 207*, answered by Mr. *James Brown Ashton*.

It was *Alfred the great* who first caused the Tenth Part of his *Revenue* to be given for the Support of Churches and Temples. Among other good Regulations of this Prince, he instituted *Juries*; and also divided the Kingdom into *Sbires* and *Hundreds*.

III. *Quere 208*, answered by the Proposer Mr. *Lyon*, at *Margate*.

According to *Tradition*, that prevailed among the Priests of *Ægypt*, *Helen* was taken from *Paris*, before he reached *Troy*.

The Tradition, according to *Herodotus*, who had it from the Priests, is this. *Paris*, on his Return with *Helen*, was by Stress of Weather driven on the Coast of *Ægypt*, and forced to put into *Tarichia*, on the *Canopian*, North of the River *Nile*. Here some Slaves of *Paris's* Retinue, taking Sanctuary in a Temple of *Hercules*, which stood on that Shore, informed against their Master to the Governor of that Place, whose Name was *Tbonis*, the Injury which *Paris* had done to *Menelaus*, aggravating each Circumstance. *Tbonis*, the Governor, laid the whole Affair before *Portius*, at that Time King of *Ægypt*; who, finding, upon Examination, the Disposition of Slaves to Truth, detained *Helen*, and the Treasures that had been taken with her, in Order to restore them and her to *Menelaus*; and commanded *Paris* to depart his Kingdom, within three Days, on Pain of his being treated as an Enemy.

By which Tradition it appears, that *Helen* was never taken to *Troy* by *Paris*, but left in *Ægypt*. (You see how the Fictions of the Poets are to be depended on!) Of all this Affair the *Ægyptian* Priests informed *Herodotus*, that they knew for certain it was as it thus had been handed down to them from those who had it from *Menelaus* himself. The Argument *Herodotus* produces, to prove the Truth of this Tradition, may be seen in Book ii. Chap. 113, and following, of that Author; or in the 4th Vol. p. 491, &c. of *The Universal History*.

Mr. *James Brown Ashton*, of *Lincoln*, answers, that he accidentally met with a Manuscript in a Gentleman's Library, which he thinks was written about 200 Years ago, by the Condition it appears in; but had neither Name nor Date to it: Wherein it is confidently asserted, (in Opposition to every Dispute, ancient or modern,) that *Paris* stole *Helen* from ancient Greece, and landed with her at *Troy*, and at no other Place. We therefore recommend it to our Correspondents to call on Mr. *Ashton*, and read this Manuscript, for farther Satisfaction, by soliciting a Sight of it, if they doubt this Account, or that by Mr. *Lyon*.

N. B. The Manuscript Authority may not be greater than a printed one.

IV. *Quere 209*, answered by Mr. *Lyon*, of *Margate*.

Let two Bodies, A and B, be one heavier, and one lighter, than the other; their specific Gravities as *a* to *b*. Let the Weight of A be given, and denoted by

by W ; and let it be required to find what Weight w , of the lighter Body B, must be connected with the heavier A, so that the compounded Body shall have the same specific Gravity with Water.

Because $A = \frac{W}{a}$, and $B = \frac{w}{b}$, therefore $A + B = \frac{W}{a} + \frac{w}{b} =$

$\frac{Wb + wa}{ab} =$ Bulk of Water ; which, multiplied by its specific Gravity, c , gives the Weight of Water $\frac{Wbc + wac}{ab} = W + w =$ Weight of both Bodies.

Whence we have $Wbc + wac = Wab + wab$; and $Wbc - Wab = wab - wac$. Consequently, $\frac{Wbc - Wab}{ab - ac} = w$; or, if $c = 1$, then we have

$\frac{Wb - Wab}{ab - ac} = \frac{b - ab}{ab - a} \times W = w =$ Weight of the Body B, required.

Example. Admit the specific Gravity of a Man's Body, Sea-Water, and Cork, to be as 10, 9, $2\frac{1}{4}$; then $a = 10$, $c = 9$, $b = 2\frac{1}{4}$. Let $W = 150$ lb.

$=$ Weight of a Man's Body ; then $\frac{Wab - Wbc}{ab - ac} = w = 5$. Therefore, if

such a Man were to take 5 lb. of Cork with him into the Water, he would be of the same specific Gravity with Water ; and the least additional Weight of Cork more would prevent him from sinking ; and the more so, the more Cork above 5 lb. he takes. W. W. R.

V. *Quere* 210, answered by a Moon-Surveyor, at Hornsey, near London.

If this Dealer in Shadows be the same M. Wittbell, who is a Teacher of Longitude, who can forbear to admire his Doctrine of Obscurities ? — But, to come to the Point in Hand ; This young old Gentleman, it seems, has appeared in the *Philosophical Transactions*, supported by an eminent Doctor, as Anglicanus informs us, (p. 72, Pal. 1769,) who might perhaps have a Hand in the Greek Letters there introduced, if M. Wittbell knows neither Greek nor English. — But, to come nearer to the Point : It certainly was a wrong Step in M. Wittbell to use a *strait* Line for one that is *crooked* in Nature, in the Passage of Jupiter's Satellites through his Shadow, for determining the precise Difference (to a Hair-splitting Exactness) of the Semi-Duration, or Semi-Continuance, of any one of those Satellites, in the Shadow's Obscurity : When it is so evident, that a Satellite, passing through the Shadow of any Primary, must necessarily describe a *Curve-Line* of a different Kind ; and different at different Times ; which our metaphysical and mechanical Astronomer, M. Wittbell, has not included in his Determination and Demonstration of that real Difference, he pretends to find out : Though every real Astronomer must be sensible (before M. Wittbell knew an *Ellipsis* from a *Circle*) that there is a Difference of the Moon's Semi-Duration, through the Earth's Shadow, by its *curved* Passage only, (exclusive of the Shadow and Form through which the Moon passes, by the *oblate* Figure of the Earth, as yet undetermined : And consequently, the same Reasoning holds good of Jupiter's Shadow, and his Satellites, passing through it. As to the Determination of the Form of Jupiter's Shadow, from his supposed oblate Figure, the Section being an *Ellipsis* of some Sort, does not account for the curved Passage of a Satellite through it, omitted by M. Wittbell and French Astronomers ; who must go to Work once more, to find the Truth.

Continuation des Merveilles de Monsieur. Witchell : Or, Witchell's Wonders continued : Translated from the French by Anglicanus. See last Page, Pall. 1769.

Qui Bavium non odit, amet tua carmina, Mævi. VIRG.

This new Hair-splitting Doctrine of the allowed elliptic Curve of *Jupiter's Shadow*, (made by a Plane at Right-Angles with its Axis,) without any Difficulty to find out, will not determine the exact Curve described by one of the *Satellites* passing through that Shadow, while *M. Witchell* considers its Passage in a *strait Line*. Who, and his Friend the *Docteur*, must go to Work again, for determining the Nature of that Curve to a Truth, if they would determine the *Difference* of the Semiduration of a *Satellite's true Passage*, not in a *strait Line*.

This new Invention was inserted, piratically, it seems, in the *Connoissance des Mouvements célestes*, 1765, p. 177. (against the Honour of *English* Discovery,) and intitled, *Inégalité de la Demi-durée des Eclipses des Satellites de Jupiter, causée par l'Aplatissement de Jupiter*; that is to say, in *English* Translation, "The Inequality of the Half-Duration of the Eclipses of *Jupiter's Satellites*, caused by the flattened Form of *Jupiter's Body*." — Like a *Bowling-Green Bowl*, but not quite so flat.

The dormant State in which this *Infant* Discovery lay, in Danger of expiring, for some Time, till the saving Physician revived it, by administering a *Receipt*, in the *Philosophical Transactions*, is another Wonder, set forth by *M. Witchell*, not less to be wondered at than his Solution of the *Longitude-Problem*, for which he received but 300*l.* as a small Present for his voluminous Performance, improved and contracted by others.

M. Newton claimed of *Leibnitz* the Honour of the Invention of *Fluxions*, as *M. Witchell*, for his Friend; claims of *M. Bailley* the Honour of the Invention of the elliptic *Shadow*, and complains of *M. Bailley* for this Injustice of giving the Honour to *M. de la Lande*, without sharing it betwixt himself and the learned Doctor, his Friend. Which Usage he deems very hard, that such an amazing Discovery should be so ungenerously transferred from the original *Proprietors*, to the *Improvers*, of the Invention, our *French* Friends. Therefore a Complaint, for obtaining Justice, is proposed to be laid before the *French* Ambassador, (the sooner the better,) setting forth the Indignity offered to the *English* Nation, in a Piracy of *Invention* from two of the First-Rate *English* Geniuses, representing the same to the Royal Society, and proving the *Piracy*; for which Satisfaction is demanded.

* * * *M. Witchell* modestly believes (but not affirms) that his Solution will not be deficient in Point of Truth, who is not vain of his rude Attempt of Writing, nor flatters himself, (according to modern Stile,) in his *philosophical* Remarks against *M. Bailley*; but shall be extremely glad to see an Attempt performed better.

Fleet-street, London,

G. W.

Jan. 7, 1769.

This speculative Artist begins his speculative Operation by a Lemma, (known to every School Boy; therefore the fitter for his Purpose,) that the Plane of the Section of any Spheroid, (and consequently of a prolate one,) not perpendicular to its Axis, will be an Ellipsis: For if it was perpendicular to its Axis, he has given us to understand, it will not be an Ellipsis — What will it be then? Why a Circle. And refers you, for Demonstration, to *Simpson's Fluxions*, vol. II. p. 456. Since whose Decease he never appeared much as an Author, till he fell in with his other Friend, le Docteur.

He

He proceeds (suppositiously and elaborately) through I. *Prop.* and 4 *Corollaries*; II. III. IV. V. *Props.* and 1 *Scholium*, (decorated and dignified in Greek Characters, by his Friend *le Docteur*,) inferring several Inferences, in Consequence of accurate, but indeterminate, Suppositions, about the precise and various Dimensions of the two *Axes* of the Ellipsis, by the Section of *Jupiter's* Shadow, at certain and uncertain Distances.

1. That the Curve of the Shadow's *Section* (like cutting a Sugar-Loaf not perpendicular to its *Axis*,) will not be a *Circle*; except when the *Axis* of the Planet produced passes through the Sun's *Center*; which Time must find out. But a *Curve* of the oval Kind must be found in *Species*, from his *Equations*, (depending on what he has supposed;) who supposes the Sun *nearly*, but *not* truly, spherical, to avoid embarrassing the Solution with too many *Difficulties*.

2. He infers the *Duration* of an Eclipse of a given *Satelles* (learnedly for *Satellite*) from a supposed Distance given; the Path of the *Satelles* (or *lite*) being supposed *strait*, that is *really* curved, (another Embarrassment of speculative Theory,) making a given Angle (unknown) with a Circle of Latitude.

3. He supposes the Inclination of *Jupiter's Axis* perpendicular to his Orbit, and the Place of his Equinox (if they could be *exactly* determined by Observation) advancing; that, perhaps, these Suppositions may not occasion much Error.

4. He supposes, also, the Sine and Cosine of the Semi-Angle of the Cone of *Jupiter's* Shadow, (using Radius for the Cosine;) the Sine supposed to be 3'; — serving for a Nearness of Calculation, instead of correct Demonstration.

5. He, next, infers the *Delineation* of the Curve of the Shadow's *Section*, perpendicular to its *Axis*, *mechanically*, supposing a Semidiameter of its *Section*, at a given Distance, to be discovered; and thence infers a corresponding Semidiameter of *Jupiter's* Section, in a determinate Ratio.

6. He infers two *Cusps* to the Shadow and the Curve of the *Section*, (like the Spouts of two Pair of Blacksmiths Bellows, pointed to each other; and also a great and small Fiddle!) one at each Extremity of the lesser *Axis*, approaching towards each other, as the Distance of the Section from *Jupiter's* Center is increased. And when the Distance is taken large, (as large as is supposed,) the lesser *Axis* of the Section vanishes, and the *Cusps* meet in the Center thereof: Whence a *Satellite* may suffer a double Eclipse, by passing through two Shadows, (when it happens,) at the same *Conjunction*; which *Phænomenon* happens (when it does) at a less Distance from *Jupiter's* Center, in certain Circumstances.

7. He, next, infers the *Duration* of a Satellite Eclipse, independent of the Shadow's *Section*, having performed all his former Performances for Nothing, by supposed, for real, Ellipses, Lines, Angles, Points, &c.

N.B. His mechanical Method is equally applicable and certain with the theoretical; whether the *Axis* of *Jupiter* is perpendicular to his Orbit, or not; since the Species and Position of the elliptic Section of *Jupiter* are to be had by I. and II. *Props.* (in Consequence of what has been supposed, that cannot be certainly known,) when a Right-Line, connecting the Centers of the Sun and *Jupiter*, is perpendicular thereto.

These Conclusions being obtained, every Thing remains as at first, guessed at and imagined.

The Alterations, which the Irregularity of *Jupiter's* Shadow will produce in the Satellite-Theory must rest for a future Speculation, in the Hair-splitting Art: When the Doctors and Midwives of Science shall deliver Nature of her choicest Secrets.

N. B.

N. B. The Errors or *Difference* of the Semiduration of Satellite Eclipses (by the *French* Astronomers, from whom *M. Witchell* takes his Authority) are no less already than 20^s in the 1st, 50^s in the 2^d, 2^m 19^s in the 3^d, and 11^m 14^s in the 4th, &c. (besides 3^{ds}, 4^{ths}, 5^{ths}, &c. not reckoned;) which Discovery is equally meritorious for Utility with the Inventions of the celebrated English *Watch-Maker*, who disturbed the *Longitude*; and of *Mrs. Stevens*, who disturbed the *Stone* in the *Bladder*.

VI. *Quere* 211, answered by *Mr. Brown Abston*, of *Lincoln*.

An *Invoice-Stamp* costs Two-pence, I am told;

But a *Law-Trickster* † knows how *Law* is sold.

† See *Pallad.* 1766, p. 58.

Answered by *Mr. Alexander Rowe*, of *Reginnis, Cornwall*.

Admit the Cause be good or bad,

A *Stamp* for Two-pence can be had.

VII. *Quere*, answered by *Mr. Swift*:

The Master *Passion* that prevails is *Fear*, †

† Sometimes.

O'er Man and Woman, does to me appear.

Mr. John Bailley, of *Middleton, East-Riding, Yorkshire*, observes, that Love, Fear, Hope, and Joy, prevail by Turns.

Love, Hope, and Joy, fair Pleasure's smiling Train;

Fear, Hate, and Grief, the Family of Pain.

POPE.

Of all the Passions that possess the Mind,

Love rules predominant in all Mankind.

Au'rice and Pride may next assume their Pow'r;

Two Idols that ignoble Souls adore.

Each Passion rules, by Turns, the human Breast;

As Aaron's Serpent swallow'd all the rest.

While Grief, Joy, Fear, or Hope, in some are born,

In Turns, by Rage, Hate, Envy, some are torn.

But Love, the noblest Passion Heav'n design'd,

Acts to our Int'rest, and preserves the Kind.

Mr. Pope, in his *Pastorals*, gives this Picture of that Passion.

I know the Love in foreign Mountains bred;

Wolves gave thee Suck, and savage Tygers fed:

Thou wert from *Ætna's* burning Entrails torn,

Got by fierce Whirlwinds, and in Thunder born.

The different Languages in which the following Queries were proposed, and their Answers in the same Languages, are found too difficult for our Correspondents in general; and therefore we give them in English.

EXTRA-QUERIES, in PALLADIUM, 1768, answered by *Philo-Palladium*.

I. Hebrew. Whence might arise the Opinion, that a Bishop, going to be admitted to that holy Function, used to say, *Nolo episcopari*, I will not be a Bishop?

Ans. The Opinion is a late one; it being answered in the Papers (it is affirmed by an eminent Scholar and Master-Printer) by the present Bishop of London, till Nobody replied to it, as a mistaken Opinion; being never before answered by any in the same Way. — The Opinion has been of long Duration, according to the Words of the Text.

II. Greek.

II. Greek. *What is the Difference between Honour and Honesty?*

Ans. As much Difference as there is between Light and its Effects. True Honour is productive of Honesty, though Honesty is not always so of Honour. A Debtor may justly pay what he owes, but may want the Honour and Gratitude to acknowledge the Obligations he has received. Who may defraud Nobody of their Property, yet may meanly detain the Respect and Duty he owes to his Benefactors.

III. Latin. *What is the Difference between Law and Equity?*

Ans. As much as is the Difference between Words and Deeds. The Law directs to do Right; but Equity performs it. Or the Law does Justice in particular Cases, where Custom is both Law and Equity.

IV. French. *How do Objects, painted inverted on the Retina, appear strait?*

Ans. Those Objects, so painted, are referred back to their Originals, whence the Rays proceeded from all Points, so as to make an inverted Picture on the Retina, and by that Reference appear strait to the Sensorium, or Perception. See Keill's Anatomy.

V. Spanish. *Whether Grammarians can fix the Standard of Pronunciation of Words, or Musicians that of musical Sounds?*

Ans. Words are arbitrary Sounds, and Custom makes them current, or of Standard Signification. Grammarians may introduce new Customs of Speech, or of Pronunciation, and, by their Authority and Influence, may vary the Pronunciation of Words; but cannot absolutely fix it, which is the Property of Custom. So Musicians cannot absolutely fix the Standard of musical Sounds, which are varied, to captivate and delight the Ear, by their different Kinds of Modulation. As different Parts of the same Nation have different Dialects, in Respect to Speech and Pronunciation, the Standard of which is no more settled than the different Sounds and Modulation of Music. As there is Fluctuation in Words and their Sounds, so there is a Variation in the Combination of Sounds, never to be settled; though there are established Grammar-Rules for adjusting the Propriety of one, and Theory for directing (according to Taste) the Modulation of the other.

VI. Italian. *Whether the Lord's Day is kept on the same Day, in the weekly Period, in the several Nations, as it was kept originally?*

Ans. Authors differ in this Respect. Mr. Kennedy, in his voluminous Chronology, asserts the Shifting of the Sabbath, or Lord's Day. And our present Sabbath is said to be observed on Account of the Resurrection of Christ, which the Jews do not allow to be yet come.

VII. Portuguese. *Whether Friendship, Interest, or Honour, separately considered, is the greatest Prevailer over the human Mind?*

Ans. Interest is often the Source of Friendship, and generally more prevalent than either Friendship, or Honour. Honour begets Esteem and Friendship, mutually supporting each other, independent of Interest.

Where Friendship prevails,
There Honour ne'er fails:
Though both have been sold
For Int'rest or Gold.

ANSWERS TO ALL THE REBUSSSES IN LAST YEAR'S PALLADIUM.

I. TEA.

III. SALLY BENNET.

V. NEWMARKET.

II. BINKS.

IV. CHATHAM.

VI. WITCH-ELL.

Mr. William St. John answered all the *Rebusses*.

The 1, 3, 5, were answered in Rhime, by Mr. Vaughan, of Morpeth, who answered the 6th also.

A Hag is sometimes call'd a *Witch* ;

A Yard's five Fourths an *Ell* :

If you the *Charmer's* Charms beseech,

You'll conjure up *Witch-ell*.

The 1, 3, 5, and 6 *Rebusses* were answered by Master Thomas Flinnap, at Mr. Moore's School, at *Newmarket*,

Says Coley, my Friends, shall we treat *Sally Bennet*,

With *Tea*, and a *Dance*, and a Trip to *Newmarket* ?

Well mounted we'll go, and shall get thither soon ;

And we'll put up at *Witch-ell's*, the Sign of the *Moon*.

Mr. John Bailey, of *Middleton, Yorkshire*, answered these *Rebusses*, much in the same Manner.

The 6th *Rebus* answered by Miss Polly Stow.

Sophia her *Philo* greatly charms,

Who longs to fill her circling Arms.

So *Witchell's* Friends are much *endear'd* ;

But which the † *Witch-ells* have you heard ?

Is it the *Witch-ell* that complains ?

Or she who has a Share of Brains ?

† There are many different Persons of the same Name, of very different Talents, Occupations, Ranks, and Accomplishments.

The 5th *Rebus* answered by Miss Stow.

From *Newmarket* to *Westham*, *George Lodge* he is gone,

To find out a *Mistress* — I'll hold *ten to one*,

He'll quite go to *Maidenhead* † ere he has done.

† *Berkshire*.

Mr. George Lodge, late of *Newmarket*, but now of *Westham, Essex*, answered 1, 3, 5, 6, *Rebusses*.

Master Thomas, of Mr. Moore's School, answered the same.

1 and 5 answered by Mr. A. Rowe. 1, 3, 5, 6, answered by Mr. James Brown Ashton. To the 6th he answers :

The Works of a *Witchell*, when duly inspected,

Will be of more Worth, with their Errors corrected.

Some Works strangely pifs for the Works of a *Quaker*,

(As oft a *Watch-Joiner* is called a *Watch-Maker*.)

But what are Mens Works but the Owner's *Transactions* ?

Some *Avoiders* of Law, and some *Bringers* of Actions :

Some Lovers of Truth, and of Sense, Wit, and Spirit ;

Some *illiterate* bred, and *Despisers* of Merit :

Some Bearers of Fiction, and Dealers in Cant,

Who meanly, for Int'rest, would others transplant,

And some forgive Faults when Resentment surrenders,

And, like two *Fighting-Cocks*, place together Offenders.

Mr. Stephen Hartley answered 2, 3, 5, and 6 *Rebusses*, who says thus :

If *Sophia* the *Charmer* can charm Cuck—d-Makers,

Let *Mac-Grog* and *Mac-Hardy* be her *Undertakers*.

A CAUTION.

A CAUTION.

To prevent Misapplication of *fictitious* or *real* Names, sent us by our Correspondents, in *Rebuses* and other of their Compositions, it is necessary to observe, that there is scarcely a *real* Name of *Reputation*, but there is the same Name of *Reproach* applicable to different Persons.

The *Christian* to the same *Surname* is sometimes *different*, and sometimes *alike*; and yet the Persons, their *Abode*, and *Occupations*, may be all different.

The printed Example, of *B—ts* and *H—b*, in p. 167 of Mr. Owen's Magazine, for April 1764, by M. *W—ll*, his learned Conductor of Conundrums, is Authority sufficient for Imitation; since there is one of one Name, a noted Horse-stealer, who broke out of *Maidstone* Goal; and another of the same Name, who is said to be bled at *Battersea*, for a Defect of Mind. The other Name applied to a reputable *Oxford* Professor, not long since dead, may be also applied to one who went up *Holborn* a few Sessions ago. Mr. *Pope*'s great Example, in his *Dunciad*, of naming his *Dunces* attacking him, is another Authority for mentioning real or fictitious Names, alluding to Characters.

Notwithstanding the *Polypi-Heads* (for they are not so formidable as *Hydra's*) of a certain distributing Crew had subsisted for some Time, appearing to be tired of their Folly and vain Attempts, yet at *Portsmouth*, by a Set of *Ruffians* from *London*, a Conspiracy was formed against the same Person; in *Easter* Holidays last, when the Time of *Sots* and *Idlers* hangs most heavy on their Hands. It was then they beset him, or rather *way-laid* him, in the Night, in Order (as is supposed by those who do their Business by Day-Light) to combat against him.

The Cause of the said Attempt, it seems, was owing to his refusing Acquaintance or Connexion with that forbidding Set of Recruits (See *Pallad.* 1768, p. 71.) who are personally as unknown to him, whose Company they sought, as the Gentry of the *Posts* about *Covent-Garden*; of which Set he has only heard by Name, (*Dick Swift*, Gentleman *Harry*, &c.) as to their Fame and Exploits; and are as unknown to him as the *Sables*, *Chimney-Doctors*, and *Jobbers*, about *St. Giles's* and *Helborn*; *Palmist*s, *Conjurers*, *Calculators* of *Nativities*, and *Glimmerers*; *Clapperdongs*, *Whipjacks*, *Abram Coves*, and *Drummers*! all under one Chief, or *upright Man*, of *Bear Forest*, near *Portsmouth*.

To the PALLADIUM-AUTHOR.

INTELLIGENCE EXTRAORDINARY,

“ To tip him Brentford is no Sin —

“ I am his Man — let me begin.

ROBIRONS.

Portsmouth, April 5, 1769. On Friday last, in the Evening, when it was dark, some Persons of the lower Class from *London*, making a Visit to this Place, who stiled themselves *Chimney-Doctors*, *Doctors of Deafness*, *Mathematicians*, &c. also pretending to be known by *Gentlemen*, but only known to such as themselves; and being maliciously disposed to a certain *Town-Inhabitant* for his *Publications*, (asserting *Liberty*, *Truth*, and *Justice*,) endeavoured, by all the *Stratagems* they could contrive, to get him into their Company, (being all drunk;) in Order to tip him *Brentford*, or *M^cQuirk* him, *mathematically*; But failing of Success, and being shocked at their Disappointment, they left *Portsmouth* the next Morning, upbraiding and accusing one another of the wrong Measures they had taken to effect their intended Purpose.

Purpose. Who *padding* it back again to London, disconsolate and discomfited, (supported by Spirits artificial,) from whence they came hither to visit a Friend and *Accomplice* in the said Undertaking; who made them all drunk and ripe for Design!

But, as their *unwearied* Diligence may make them undertake another Visit to their *academical* Friend at Portsmouth, in Hopes of better Success in accomplishing the same Undertaking, the said *Town-Inhabitant* has properly provided himself for their Reception, in their next Visit or *Approximation* to him, here or elsewhere. *Anti-Mac-Greg, Robirons, Ironside, Cacodæmon, Steel-sint, Whitewitch, &c.*

I am yours, VERITAS,

A Friend to Freedom, Honesty, Truth, and Justice.

N. B. Since this premeditated *Assassination* at Portsmouth happened, a Brother of the *Gang* has been heard to declare in London, at one of his Houses of Call, that he wanted the *Palladium-Author's* Blood; who, putting himself upon the Footing of a Gentleman, by pretending to know the *Sword*, will venture his Life, he said: But being unknown to the *Palladium-Author*, (who knew of no personal Offence given,) a Brace of *Bull-dogs* and *Jack Ketch* are ready to undertake him! without the Trouble of putting his boasted *Courage* to the Proof of each Combatant sitting on a Barrel of *Gunpowder*, and setting Fire to a Train betwixt them; a *new Improvement of Duelling*! lately introduced, when both Combatants are Gentlemen.

See *Whitehall Evening*, April 11, 1769.

ANSWERS TO THE PARADOXES IN LAST YEAR'S PALLADIUM.

I. *Paradox*, answered by Miss Stow.

THE Side of a Hill being rail'd fifty* Feet,
Forty Post and of Pale there will fence it complete.

* The Hill's Half-Breadth 40, Height 30, and Side 50 Feet; completing a right-Angled Triangle.

N. B. The Post and Pale are carried perpendicular and equal to the Length of the Base, or Half-Breadth of the Hill, quite up the Side thereof.

Mr. Alexander Rowe supposes the Advantage to the Workman, by converting an oblong Fence of 20 by 5 into a square Fence of 10 by 10, where the oblong has 50, and the square 40 Perimeter, to the same Content of 100: But 40 square would not pale 50 oblong Circuit, on a Plain; though 50 oblong would pale 40 square Paling, and save sufficient inclosing Land, as circular Inclosures would have still less (or less) Bounds to the same Area.

II. *Paradox*, answered by Quiblerus, a Connoisseur in Trifles.

A Dyer, who dy'd and surviv'd;

Like a Bankrupt that broke — and yet thriv'd.

It was answer'd by Mr. James Brown Ashton.

III. *Paradox*, answered by Juvenis.

Last February 29, by the Sages I am told,

Being twenty Years of Age, he was but six Birth-Days old.

Mr. John Bailey, of Middleton, Yorkshire, answered it in the same Manner. Mr. James Brown Ashton, of Lincoln, answered it, Mr. Stephen Hartley, and others.

N. B.

N. B. We are obliged to reject a great Deal of *dressy* Thought in Rhime, not fit to insert in a *Palladium* of Science; and therefore we recommend to all our Correspondents to be as correct and refined as possible in their Versifications.

Many Persons urge the Insertion of their incorrect Productions; with which we cannot comply, as being unfit for the public Eye. For though all Compositions have but their several Degrees of Utility and Elegance, yet, as a Pilot, (having had some Experience in Navigation,) we would not run our Correspondents ashore upon *Low-Water Mark*; nor yet upon the Rocks and Quick sands of the *Shallows*.

Those *Pretenders* to mathematical Judgement and *Criticism*, endeavouring to make themselves considerable by finding Fault with superior Judgement, or a celebrated *Mathematician's* Works, as not so fit for School-Boys and Learners as they could have performed them, should (like *Newton's* Critics) first study them, and learn to understand those Works, before they assume superior Judgement. Otherwise, *Watch-joiners*, *illiterate Pedants*, *Charity-School-Teachers*, and the *Workers in Brass and Steel*, and those who cannot spell and write *English*, may, with equal Propriety, assume to be *Critics* in *Literature* and *Science*.

ANSWERS TO THE QUESTIONS IN LAST YEAR'S PALLADIUM.

I. *Question 375*, answered by Mr. *Thomas Robinson*, of *Biddick*: Correcting the wrong *Data*.

$$\left. \begin{array}{l} 1. \{ x + y + z = 36 = a. \\ 2. \{ y\sqrt{xz} = 129.0735 = b. \\ 3. \{ \sqrt{y} + xz = 88.7416 = c. \end{array} \right\} \begin{array}{l} x, y, \text{ and } z \text{ required,} \end{array}$$

$$4. \text{ by 3d. } xz = c - \sqrt{y}.$$

$$5. \text{ by 2d. } xz = \frac{b^2}{y^2} = c - \sqrt{y}; \text{ whence } cy^2 - y^2\sqrt{y} = b^2, \text{ or } y^3 - c^2y^4 + 2b^2cy^2 = b^4.$$

Hence, $y = 14$, $x = 17$, $z = 5$, answering to *ROE. W. W. R.*

Mr. *William Hardy* answered it, by correcting the *Data*. Mr. *Draper* gave the same Answer.

The *Data* were sent so incorrect (especially in the Numbers 128,6267 instead of 129,0725, and 38,7416 instead of 88,7416, which we corrected) that no Correspondent could solve them but by Information. — Miss *Stow* was cautious of giving her *Lover's* Name too plain.

Mr. *J. H.* of *Lewes, Sussex*, answered it.

Mr. *Alexander Rowe* (omitting the *w*, and correcting the Misprint) answers Miss *Stow* thus.

Had I but *Merit* equal to your *Pow'rs*,
How blest'd I'd live with you in *Cornish* Bow'rs!
I never would my double *Namesake* know,
Nor Fribble *Molromitish* Lover *ROE*.

Mr. *Sadler* observed the printed *Mistake* in this *Question*, and solved it: Mr. *John You* —, *Birmingham*, (Name cut off by the Author's Scissars,) and others.

II. Question 376, answered by Capt. Edward Williams, of the Royal Artillery, Woolwich.

Put x = Number of Eggs at each Price; then $2x$ = all the Eggs.

Th. $\frac{1}{2}x + \frac{1}{3}x = \frac{4x}{5} + 1$; whence $x = 30$, and $2x = 60$, the Eggs required.

Mr. Thomas Robinson answered it thus.

Put $2x$ = Number of Eggs bought by the Lady. Then, $\frac{x}{2} + \frac{x}{3} =$

$\frac{5x}{6}$ = Pence laid out by the Lady.

As $5 : 2 :: 2x : \frac{4x}{5}$ = Pence the Gentleman paid to the Market-Lady.

Th. $\frac{5x}{6} - \frac{5x}{5} = 1$; hence $x = 30$; and $2x = 60$, the Eggs bought by the Lady.

Mr. William Herdy, Master of Cottingham School, near Hull, answered it; as did Mr. William Turner, Teacher of Mathematics and Writing-Master, of Whitney, Oxfordshire, Mr. Draper, Mr. John Lupton, of Mr. Townshend's Academy, at Doncaster, Yorkshire, Mr. R. Judson, of Beverley, Yorkshire, Mr. William Roberts, of Greasbrough, near Rotherham, Master Thomas, of Mr. Moore's School, Newmarket, Mr. William Pen, Chalfont, Mr. J. H. of Lewes, Mr. Alexander Rowe, Mr. Sadler, Mr. W. Ford, of Frampton upon Severn, Mr. John Eadon, Mr. Jonathan France, Schoolmaster, at Wormhill, Derbyshire, Mr. Stephen Hartley, of Sowerby-Bridge, Mr. Robert Langley, of Hitchin, Mr. John Yon—, (the Name cut off,) Birmingham.

III. Question 377, answered by Capt. Edward Williams, of Woolwich.

The 70 half full will make 35 full; and there will then be 105 full, and as many empty Casks; one Third of which will be 35 full + 35 empty, for each Merchant.

Mr. William Hardy, Master of Cottingham Free-School, near Hull, Mr. William Turner, of Whitney, and Mr. Thomas Robinson, of Biddick, answered it, to the same Purpose. As did Mr. Lupton, of Doncaster, Mr. Draper, and Master Thomas, of Mr. Moore's School, Newmarket.

In all such Questions let x = full, bx = half full, cx = empty Cask.

Then, $x + \frac{bx}{2} = \text{full}$; $cx + \frac{bx}{2} = \text{empty}$; one Third of which $\frac{2x + bx}{6} =$

full; and $\frac{2cx + bx}{6} = \text{empty}$, for each Merchant's Share.

Now, when $b = c = 1$, $x = 70$, they become $\frac{x}{2}$, and $\frac{x}{2} = \frac{70}{2} = 35$,

full and empty, as before. If $b = 2$, $c = 3$, they become $\frac{2x}{3}$ and $\frac{x}{3}$; where

x must be once, twice, thrice, &c. 3. Suppose 24 by 3 = 72: Then, 72 = full; 144 half full; and 216 empty; to be divided into 3 Shares;

Shares; when each third Share would be 48 full and 96 empty, $= \frac{22}{3}$

and $\frac{4x}{3}$, from above, agreeably to Capt. Williams's Method.

N. B. Those Correspondents, who gave Variety of Answers to the foregoing Question, by different full, half full, and empty Casks, (*imagining they had made a new Discovery,*) will find that *each* of their Answers, being reduced to full and empty Casks, will make just the same Number of full and empty Casks, (*viz.* 35,) as concisely given by Capt. Williams; whose is the short and proper Way of answering these Questions, when they are possible.

Palladium Author.

This Question was answered by Mr. W. Pen, Chalfont, Mr. J. H. of Lewes, Mr. Alexander Rowe, (one solves it $23\frac{1}{2}$ Casks $= \frac{70}{3}$; but how can Casks be divided?) Mr. John Eadon, Mr. Jonathan France, Mr. Stephen Hartley, Mr. Robert Langley, and others.

IV. Question 378, answered by Mr. W. Hardy, of Cottingham-School.

By a Table of Logarithms and Trial. If $x = 9950$, the Error found is 5.64 too little. If $x = 9955$, the Error is 4.58 too much.

Errors, unlike, Addition use;

But, when alike, Subtraction choose.

Hence, $\frac{9950 \times 4.58 + 9955 \times 5.64}{5.64 + 4.58} = 9952l. 15s.$ the Miser can lend.

Mr. Robinson, of Biddick, says, when $x^{\frac{99}{100}} + x^{\frac{100}{99}} = 20000l.$ $x = 9952l.$ nearly. Therefore, $\frac{99}{100} \times \text{Log. } 9952 + \frac{100}{99} \times \text{Log. } 9952 = 19997.7$ by a Table of Logarithms; and $20000 - 19997.7 = 2.3$, the Error too little. Again, if $x = 9953$, then $\frac{99}{100} \times \text{Log. } 9953 + \frac{100}{99} \times \text{Log. } 9953 = 1999.598$, when the Error is 0.402 too little. Hence, by the Rule of Position, 9953.193; or 9953l. 3s. 10d. the Miser's Money to let out.

Mr. John Eadon makes it 9952.975l.

Mr. J. H. of Lewes, gives (from Problem 92, Rule 5, Emerson's Algebra) $x = 9952l. 14s. 6\frac{1}{2}d.$ the Miser's Money. Mr. Alexander Rowe, 9952l. 14s. 6d. (confirming Mr. J. H.'s Solution,) who, at 10 per Cent. makes his yearly Income 995l. 5s. 5 $\frac{1}{2}d.$ and observes thus,

The Miser's Shrine so much infects his Head

One Night, he can't rest quiet in his Bed.

Mr. John Eadon answered it, 9953.756, &c.

Mr. Stephen Hartley, 9952l. 15s. 5d.

One Correspondent makes 147l. 1s. 5d. the Answer; but we advise all Correspondents to be careful and correct in their Numbers, if they expect Credit and Notice. We also desire all Correspondents, that can, will send the Numbers wrought out, if they expect to see their Solutions inserted; since no Trust can be put in a Process, without the Proof, or Result, — Correspondents

Sents only lose their Time, if they send Methods without Numbers ; which are no Answers.

V. Question 379, answered by the Proposer, Mr. Thomas Naylor, jun. of Sheffield School.

Put $r^3 = x$, $n^4 = y$.

Then		$\sqrt[3]{r^6} + \sqrt[3]{r^{12}}$	}	$r \text{ and } n^2$
1.	$\frac{\sqrt[3]{r^6} + \sqrt[3]{r^{12}}}{\sqrt[3]{n^4}} = 3 + 3n^4$			
2.	$\frac{9\sqrt[3]{n^{12}} - 8r^6}{3r^3} = \sqrt[3]{n^4}$		}	Here $\frac{yy^{\frac{3}{2}} - 8x^2}{3x} = y^{\frac{1}{2}}$
3.	$\frac{r^2 + n^6}{n} = 3 + 3n^4$			
3 reduced	4.	$r^2 + n^6 = 3n + 3n^5$		[was printed for $\frac{9y^{\frac{3}{2}} - 8x^2}{3x}$
2 eval. 2	5.	$\frac{9n^6 - 8r^6}{3r^3} = n^2$		[$= y^{\frac{1}{2}}$
5 reduced	6.	$9n^6 - 8r^6 = 3n^2r^3$		

By 4 and 6 Steps $r = n = 3$, th. $r^3 = x = 27$; and $n^4 = y = 81$;

but $\frac{1}{2}x = 13\frac{1}{2}$ Years, and $\sqrt[4]{y} = 3$ Months; th. 13 Years 9 Months, my Age.

N. B. No more of these Questions, unless sent plainly written, and properly expressed.

$\sqrt[4]{y} = 3$ Months when squared twice, or double squared $= 81 = y$; but

$\sqrt[4]{y} = 3$ Months was not sent in Terms of the Question; but y , the double Squaring, was signified: So that y , or 81, being the Months squared twice, therefore 3 Months (not 9) answers to the Words sent by the Proposer:

y is just equal my Months double squared,

should be,

y is just equal my Months being squared.

We here give Mr. Robinson's analytical Answer to the Equations printed, as a masterly Pattern of the analytic Art.

Answer by Mr. Robinson, of Biddick.

Put $a^4 = x$, and $z^4 = y$.

Then	{	1.	$\frac{a^2 + z^6}{z} = 3 + 3z^4$	}	From the given Equations,
2.		$\frac{z^{10} - 8a^8}{3a^4} = z^2$			

3 reduced 3. $a^2 = 3z + 3z^5 - z^6$

2 reduced 4. $a^8 + \frac{3z^2}{3}a^4 = \frac{z^{10}}{3 + 8z^2}$

$$4 \text{ C. } \square \left| \begin{array}{l} 5. a^3 + \frac{3x^2a^4}{8} + \frac{9x^4}{256} = \frac{x^{10}}{8+8x^2} + \frac{9x^4}{256} \\ 6. a^2 = \sqrt{\sqrt{\frac{x^{10}}{8+8x^2} + \frac{9x^4}{256}}} - \frac{3x^2}{16} = 3x + 3x^3 - 26, \end{array} \right.$$

[from 3d Step.]

Whence may be determined, by the Method of *Trial and Error*, or Rule of *Position*, the Value of x and y , according to the given Equations.

Mr. J. H. of *Lewes*, finds $13\frac{1}{2}$ Years. Mr. John Eadon answered it.

VI. QUESTION 380, answered by Captain Williams, of Woolwich.

PUT $A = 1500$, $a = 1000$, $R = 3$, $r = 5$, and $t =$ Time required.

Then, by the Rules of *Simple Interest*, $a + \frac{art}{100} = A + \frac{ARt}{100}$; whence, t

$$= 100 \times \frac{A - a}{ar - AR} = 20 \text{ Years. W. W. R.}$$

By Mr. Robinson, of Biddick.

AS $100 : 5 :: 1000 : 50\%$. 1 Year's Interest.

$100 : 3 :: 1500 : 45\%$. 1 Year's Interest.

RULE. Divide the Difference of Principals by the Difference of their yearly Interest for the Years (viz. 100) required.

$$\frac{1500 - 1000}{50 - 45} = \frac{500}{5} = 100 \text{ Years, required.}$$

Mr. R. Judson, of Beverly, solved it; Mr. Draper; Mr. William Hardy, of Cottingham School; Mr. Alexander Rowe, of Reginnis, Cornwall; Mr. Jonathan France, of Wormbill, Derbyshire; Mr. Stephen Hartley, of Sowerby Bridge; and Mr. Robert Langley.

VII. QUESTION 381, answered by Captain Edward Williams, of the Royal Artillery, Woolwich.

PUT $p = 20$, $r = .04$; $a = 200$, $n = 2$, and $t =$ Time required.

Then will $p \times 1 + \frac{r}{n} \Big|^{tn} = a$; Th. $1 + \frac{r}{n} \Big|^{tn} = \frac{a}{p} = 10$; and by Log^s

$$tn \times \text{Log. } 1 + \frac{r}{n} = \text{Log. } 10 = 1 = 2t \times \text{Log. } 1.02 = 2t, 003602 : \text{Th. } t$$

$$= \frac{.5}{.003602} = 58,138 \text{ Years. W. W. R.}$$

Mr. William Hardy, Master of Cottingham School, solves it thus.

PUT $p = 20\%$. $a = 200\%$. and $r = 1.02$, the Amount of 1l. and its Inte-

rest for Half a Year; and $t =$ Time required. — Then $pr^t = a$. By Log^s

$$t = \frac{\text{Log. } a - \text{Log. } p}{\text{Log. } r} = 116,2763656 \text{ Half Years, by the compound Inte-}$$

rest Theorem, = 58,1381828 Years. But *simple Interest*, only, must be allowed for the Time above complete Half Years. Which Time is therefore

58 Yrs. 1 M. 2 W. 5 D. 22 M. differing, in this Case, from the common Compound-Interest Theorem, 2 Days, 6 Hours, and 8 Minutes.

Mr. Robinson, of Biddick, puts $2x =$ Half-Years required. Then, as $100 : 4 :: 1 : .04$ Interest of 1% for a Year.

Th. $20 \times 1 + \frac{.04}{2} \Big|^{2x} = 200$. And $1.02 \Big|^{2x} = 10$. Whence, by Logs,

$2x = 116,2717$ Half-Years, or $58,13585$ Years, required.

Mr. R. Judson, of Beverly, by Mr. Hardy's first Method, makes it $116,279$ Half-Years, or $58,139$ Years. Mr. Pen, of Chalfont, $116,368$ Half-Years.

Mr. Alexander Rowe gets $1.0404 \Big|^{2x} = 10$, whence $x = \frac{\text{Log. } 10}{\text{Log. } 1.0404} =$

58.13852 Years, required.

Mr. Sadler solved it numerically; and Mr. John Eadon answered it; as did Mr. Jonathan France, of Wormbill, and Mr. Robert Langley.

VIII. QUESTION 382, by Capt. Williams, of Woolwich.

ACCORDING to Ward's Young Math. Guide, the Pound Avoirdupoise is to the Pound Troy, as 1 to 1.215 . $\therefore \frac{6 \times 1.215}{16} = 0.456$ Pence is the Price per Ounce required.

Mr. William Turner, Master of Witney School, Oxfordshire, answered it also from Ward, who found that $1\text{ lb. avoird.} = 14\text{ oz. } 11\text{ dwts. } 15\frac{1}{2}\text{ Grains}$. Th. $12\text{ oz. Troy} : 6\text{d} :: 14\text{ oz. } 11\text{ dwts. } 15\frac{1}{2}\text{ grs. Troy} : 7\text{d. } .29114 =$ Value 1 lb. avoird. which, divided by 16 , gives 1.82276 , &c. Farthings per oz. confirming Capt. Williams's Solution.

But, by the foregoing Equality it is seen, that the Ounce Avoirdupoise is to the Ounce Troy, as 51 to 56 , nearly.

Th. $\frac{51 \times 2\text{ Farthings}}{56} = 1.82142$, &c. Farthings, nearly as before.

By Mr. Hardy, of Cottingham.

As $5760\text{ grs.} : 6\text{d} :: 437.46875\text{ grs.} : 1.8227864583\text{ Farthings exactly}$.

Mr. J. H. of Lewes, says, by Hinton's Dictionary, the Ounce Troy contains 480 Grains, and Ounce Avoirdupoise only 448 ; Th, as $480\text{ grs.} : 2\text{ Farthings} :: 448\text{ Grains} : 1.8666$, &c. Farthings, required.

Mr. Alex. Rowe sends, As $\frac{576}{12} : \frac{700}{16} :: 2\text{ grs.} : 1\frac{2}{9}\text{ Farthings, the}$

Price required.

Those who answered it by Proportion of 12 to 16 Ounces are wrong.

Mr. John Eadon's Answer is $1\frac{1}{7}$ Farthings; who says Mr. Ward found $14\text{ oz. } 11\text{ dwts. } 15\frac{1}{2}\text{ grs. Troy} = 6999\frac{1}{2}\text{ grs. Avoird.}$

Mr. Stephen Harley, 1.8228 Farthings, by Proportions from Ward.

Mr. Jonathan France, (from Baker's Arithm.) nearly; Mr. Robert Langley, of Hitchin, $1\frac{2}{9}$ Farthings.

IX. QUESTION 383, answered by Mr. Robinson of Biddick.

PUT $b = 2000$, x and $y =$ two first Parts, $b - x - y =$ third Part; $b - x =$ Sum of the 2d and 3d; $b - y =$ Sum of the 1st and 3d; and $x + y =$ Sum of the 1st and 2d: Th. $\frac{b-x}{x} + \frac{b-y}{y} + \frac{x+y}{b-x-y} = 10$ by Question.

This Equation reduced becomes $\frac{b^2y - 2bay - by^2 + x^2y + xy^2 - b^2x - bx^2}{bxy - x^2y - xy^2}$;

then will $\frac{b^2 - bx}{by - xy - y^2} = c - \frac{b+x}{x}$ by Reduction; Put $c + 1 = d$; Th.

$$\frac{b^2 - bx}{by - xy - y^2} = \frac{dx - b}{x}, \text{ which reduced is } y^2 + \frac{b}{x} \times y = \frac{bx^2 - b^2x}{b - dx}.$$

Now, completing the Square, find the Value of y in Terms of x , which being substituted in the 1st Equation, the 3 Parts will be found nearly 390, 419, and 1281. W. W. R.

N. B. As there are 2 unknown Quantities, and but one Equation, in the foregoing Conditions, one of the unknown Quantities may be assumed at Pleasure; whence the Equation will be easily solved, and a great Deal of Labour shortened, in finding the true Answer in whole Numbers, which was not designed.

PALLADIUM-AUTHOR.

The same answered by the PALLADIUM-AUTHOR.

TO beat these analytic Rounds, put x and y for the 1st and 2d Parts; $a = 2000$. then $a - x + y =$ 3d Part; $b = 10$. Now, $\frac{x}{y} + \frac{y}{a} + \frac{a - x + y}{x} + \frac{a - x + y}{y} + \frac{x}{a - x + y} + \frac{y}{a - x + y} = b$, the Sum of all these Quotients.

$$\text{That is, } \frac{x^2 + y^2 + \frac{x+y}{yx} \times a - x + y}{yx} + \frac{x+y}{a - x + y} = b.$$

$$\text{Or, } \frac{a \times x + y}{yx} - 2 + \frac{x+y}{a - x + y} = b. \text{ (Let } b + 2 = 12 = c.)$$

When any Sum is divided into a given Number of equal Parts, the Sum of all the Quotients, of each Part divided by the other, will be a Minimum, or the least Quantity; because each Quotient will be $= 1$. As it is evident, that when one Share is infinitely small, the Sum of all such Quotients will be a Maximum, or the greatest Quantity possible.

Therefore, to come nearest a Minimum, for the Sum of the 6 Quotients to be $= 10$ (instead of 6) let two of the Parts be supposed alike, or $x = y$.

$$\text{Then the above general Equation reduces to this; viz. } \frac{2ay}{yy} + \frac{2y}{a - 2y}$$

$$= c, \text{ or, } \frac{a}{y} + \frac{y}{a - 2y} = \frac{c}{2}. \text{ But, by Reduction, } yy - \frac{c+4}{c+1} \times \frac{a}{2} y =$$

$$\frac{-a^2}{c+1}. \text{ In Numbers, } yy - \frac{16000}{13} y = \frac{-4000000}{13}. \text{ Or, } yy - 1230.77$$

$y = -307692.3$ nearly.

Whence, by completing the *Square*, and taking the *Root*, $y = \pm 266.470 + 615.385 = 881.855 = x$, for the 1st and 2d Parts; whence the 3d Share $= 236.29$.

Or $y - x =$	$\begin{array}{r} 348.915 \\ 348.915 \\ 1302.170 \\ \hline \end{array}$	<div style="text-align: right;">Parts.</div> <div style="text-align: right;">1.</div> <div style="text-align: right;">2.</div> <div style="text-align: right;">3.</div>
Sum	2000.000	

<div style="text-align: right;">Parts.</div> <div style="text-align: right;">1. . . . £. 881.855</div> <div style="text-align: right;">2. . . . 881.855</div> <div style="text-align: right;">3. . . . 236.290</div>	<div style="text-align: right;">Proof 2000.000 Sum.</div>
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Otherwise. Put x, mx, nx , for the Parts of 2000*l.* $= a$, so that the *Sum* of all the *Quotients* (of each Part divided by the other) may be $= 10 = b$.

$$\text{Then, } \frac{x}{mx} + \frac{mx}{x} + \frac{x}{nx} + \frac{nx}{x} + \frac{mx}{nx} + \frac{nx}{mx} = b.$$

And, $x + mx + nx = a$, by *Question*.

$$\text{By 1st Equation, } \frac{1}{m} + \frac{m}{1} + \frac{1}{n} + \frac{n}{1} + \frac{m}{n} + \frac{n}{m} = b.$$

$$\text{Second, } x = \frac{a}{1+m+n}.$$

$$\text{First collected, } \frac{1+n}{m} + \frac{1+m}{n} + \frac{m+n}{1} = b.$$

$$\text{Viz. } \frac{1+n \times n + 1+m \times m}{mn} = b.$$

$$\text{Reduced, } m^2 + \frac{n^2+1-nb}{n+1} m = \frac{-n^2+n}{n+1} = \frac{-n+1 \times n}{n+1} = -n.$$

Now, when $n = 1$, then the 1st and 2d Parts are alike, and the above Equation becomes $m^2 - 4m = -1$. Here (by C. \square and *extracting the Root*)

$$m = \pm \sqrt{3} : + 2 = \pm 1.73205 + 2 = 3.73205 \text{ and } 0.26795 \text{ respectively.}$$

Whence, $x = 348.915$ } and the first, second, and third, Parts, as by the
and 881.855 } former Method.

N. B. By the above Equation, one Part, you see, may be equal to another, or twice as much as another, by making $m = 2$; and may be 3 Times more than another, making $n = 3$; and 4 Times more than another, by assuming $n = 4$; and n may be a little more than 4, but cannot be 5; because, then the Equation becomes impossible, and can have no Root, in the 3d Case of Quadratics: Wherefore, the Ratio of any two Parts of three, into which 2000*l.* is divided, for the Sum of all the Quotients (when each Part is divided by the other) to be equal 10, lie between 1 and 4; but not 1 and 5; which being duly taken, the third Part follows.

If you would have the Shares, x, mx , and nx , increase in arithmetical Progression;

$$\text{Then, } x + nx = 2mx, \text{ and } 1 + n = 2m;$$

Or,

Or, $n = 2m - 1$; hence the collected Equation reduces to this, viz, $m^2 -$

$$\frac{b}{3}n = -\frac{b}{6}.$$

Here, $m = \pm \sqrt{\frac{b^2 - 6b}{36}} : + \frac{b}{6} = \pm 1.05409 + 1.66666$, &c. =

2.72075 and 0.61257. Whence, $n = 2m - 1 = 4.44150$, and 0.22514, respectively.

Consequently, $x = 245.03047$ } increasing in
 $mx = 666.66666$ } arithmetical
 $nx = 1088.30283$ } Progression.

Proof 1099.99996

N. B. The second ambiguous Value of m and n finds the greatest Number 1088.30283 first, for x ; and the other Values of $1 + m + n$, by which 2000 is divided, finds the decreasing arithmetical Progression exactly the same as before.

Thus any possible Conditions of the 3 Parts may be found, excepting the Condition of whole Numbers, which this Question appears not to exactly admit of.

Mr. Mason's Question of this Sort, in the *Ladies Diary*, some Years ago, is easily resolved thus. Let x and mx be the two Parts into which 10000. = a is to be divided, the Sum of both Quotients = b .

Then $x + mx = a$; here $x = \frac{a}{1+m}$;

And $\frac{x}{mx} + \frac{mx}{x} = b$; here $\frac{1}{m} + \frac{m}{1} = b$;

Whence, $m^2 - bm = -1$ (3d Case Quadratics), and $m = \pm \sqrt{\frac{b^2}{4} - 1}$;

$+\frac{b}{2}$. The rest follow.

Mr. Alexander Rowe answered it, supposing two of the Parts as 4 to 6.

Some answered it by 2, instead of 3, Shares expressed, and therefore lost Labour. Mr. John Eadon, of Sheffield, observing that as the Number of unknown Quantities exceeds the Number of Equations by 1, therefore the 1st Part may be always supposed, that is consistent, and possible; who, after a short

Process, gives, as above, $x^2 + 2nx = \pm r$, and $x = \sqrt{n^2 \pm r} \pm r$; where $a = 2000$; $b =$ any Number taken at Pleasure; $c = 10$; $\pm r =$

$$\frac{c+1 \times b, - a}{a-b-bc-2 \times b}; \pm 2n = \frac{2+bc+2b-a \times a; - c+1 \times b^2}{a-2, - c+1 \times b}.$$

Whence, $x = \sqrt{\frac{687500}{2}} \pm 750 = 1228,713$ } Parts
 $a-b-x = 271,287$ } required.
 $b = 500.000 =$ Part taken.

2000

Mr. Stephen Hartley, by a similar Process, finds that the assumed Number cannot be less than 181, nor more than 1762, between which Limits, he determines, that innumerable Answers may be found.

X. QUESTION 384, answered by Capt. Edward Williams, of Woolwich.
 PUT $y = \text{Alt.}$ $x = \text{Diam. Base,}$ $c = 3.1416,$ $b = \text{Solidify} = 2150.43$
 Inches. Then, $\frac{cx^2y}{4} = b,$ and $\frac{cx^2}{4} = \text{Base, also } cxy = \text{convex Surface,} =$
 $\frac{4b}{x};$ th. $\frac{cx^2}{4} + \frac{4b}{x} = M,$ $\frac{cx^2}{2} - \frac{4bx}{x^2} = 0;$ whence $x = \sqrt[3]{\frac{8b}{c}} =$
 $17.626,$ $y = \frac{1}{2}x = 8.813,$ Height of the *Winchester* Bushel, required.
N. B. This Question is solved by Mr. Emerson, in his *Fluxions,* p. 171, for
 the whole Cylinder. W. W. R.

The same answered by Mr. William Hardy, of Cottingham.

LET $x = \text{Diameter,}$ $y = \text{Depth;}$ then, by a known *Theorem,* $x = 2 \times$
 $\sqrt[3]{\frac{2150.4}{3.1416}} = 17.626$ Inches Diameter, and the Depth $y = \frac{x}{2} = 8.813,$ re-
 quired; confirming the Truth of Capt. Williams's Solution.

The same answered by Mr. Robinson of Biddick.

PUT $b = 2150.452$ solid Inches, $p = 3.1416,$ $x = \text{Diameter required,}$
 $px = \text{Circumf.}$ $\frac{px^2}{4} = \text{Area Base;}$ $\frac{4b}{px^2} = \text{Height;}$ th. $px \times \frac{4b}{px^2} =$
 convex Surface; th. $\frac{4b}{x} + \frac{px^2}{4} = \text{a Minimum,}$ by *Quest. In Fluxions,*
 $px^3x - 8bx = 0;$ whence $x = \sqrt[3]{\frac{8b}{p}} = 17.63$ Inches Diameter, and 8.809,
 the Height, required.

Mr. William Turner, of Witney, Oxfordshire, has curiously answered it in the
 same Manner, and very correctly: And so has Mr. R. Judson, of Beverly.
 Mr. Draper gave no Numbers to compare, without which no Solution can be
 proved. Mr. W. Roberts, of Greatbrough, near Rotherham, answered it truly;
 as did Mr. J. B. of Lewes, and Mr. W. Pen, Chalfont.

Mr. A. Rowe puts $a = 2150.42$ solid Inches in a *Winchester* Bushel, $c =$
 $.7854,$ and $x = \text{Diam. Bushel;}$ then $cx^2 = \text{Area of the Bushel,}$ $4cx = \text{Cir-}$
 cumf. at Bottom, $\frac{a}{cx^2} = \text{Depth or Alt. and } 4cx \times \frac{a}{cx^2} = \frac{4a}{x} = \text{its In-}$
 side curved Superficies. Whence, by *Quest.* $cx^2 + \frac{4a}{x} = \text{Minimum. In Flux-}$
 ions, $2cx^2 - \frac{4dx}{x^2} = 0;$ reduced, we have $cx^3 = 2a,$ and $x = \sqrt[3]{\frac{2a}{c}} =$
 $17.626,$ and Depth $= \frac{x}{2} = 8.813$ Inches, the Dimensions, required.

We have more Answers attempted, in Numbers, not wrought out, there-
 fore rejected. Mr. John Eadon, of Sheffield, methodically and judiciously an-
 swered

wered it, by Fluxions, making $x = \text{Diam. Bushel} = 2\sqrt[3]{\frac{a}{p}} = 17.604 \text{ In.}$

nearly, $y = \text{its Alt.} = 8.802 \text{ Inches, nearly,} = \frac{4}{px^2}$; where $p = 3.1416$, $n = 2.1416$. Mr. Stephen Hartley, by Fluxions, finds Diam. Bush. 17.626, and Height 8.813.

Mr. Robert Langley, 17.6252 Inches Diam. and 8.8137 In. Depth. Mr. John Ton—, Birmingham, solved it.

XI. QUESTION 385, answered by Capt. Williams of Woolwich.

ACCORDING to Mr. Emerson's Table of specific Gravities, in his *Mechanics*, 1 cubic Foot of Lead will weigh 6.326 Hundred Weight; consequently, $19800 \times \frac{1}{100} \times 6.326 = 1352.548 \text{ Hundred Weight,} = 67.627 \text{ Tons, the weight required.}$

The same answered by the Proposer, Mr. Lyon of Margate.

THE Weight of Bodies being as their specific Gravities, in equal Bulks, therefore, if the Magnitude of any Body be multiplied into the specific Gravity, the Product will be its absolute Weight.

Thus, $19800 \times \frac{1}{100} = 198$, and this by 11.325, the specific Gravity of common Lead (see *Tab. of specific Gravities in Pall. 1768, p. 67.*) is equal to 2243250 Ounces Avoird. = 62T. 11C. 1qr. 6lb. 14oz. required — agreeing nearly with Mr. J. H.'s Solution, of Lewes.

Mr. John Lupton, of Mr. Townshend's Academy, at Donsaster, makes the Weight 62T. 11C. 1qr. 8lb. 4.42964 oz. from other specific Gravity of Lead.

Mr. Robinson of Biddick, makes it 62T. 11C. 1qr. 8lb. 2.718 Ounces, by a similar Method to the foregoing.

Mr. W. Turner, of Whitney, Oxfordshire, makes it 62 $\frac{5073}{8960}$ Tons Weight.

Mr. W. Roberts, Greastrough, near Rotherham, solved it; also Mr. W. Pen, Mr. Alex. Rowe, Mr. Stephen Hartley, Mr. Jonathan Frances, Mr. Robert Langley, Mr. John Ton—, Birmingham, and others.

XII. QUESTION 386, answered by the Palladium-Author.

LET $xy + x + y = 359$. Th. $x = \frac{359-y}{y+1}$, or $y = \frac{359-x}{x+1}$, in Fractions, = a whole Number.

At first it appears, that y or x must generally be an odd Number; which being subtracted from the odd Numb. 359, the Remainder must be divisible by the Divisor $y+1$, or $x+1$, an odd Numb. though there are several Exceptions, as appear from all the Values of x and y following.

Let Men $= x = 1$ | 3 | 5 | 7 | 9 | 11 | 14 | 17 | 19 | 23 | 29 | 35 | 45 | 59 | 89 | 179 |
Then Women $= y = 179$ | 89 | 59 | 45 | 35 | 29 | 23 | 19 | 17 | 14 | 11 | 9 | 7 | 5 | 3 | 1 |

W. W. R.

Mr. Alexander Rowe answered it in a similar Manner.

One

One Correspondent sent 18 for a Number impossible ; and some send only two Numbers for Answer, and not all.

Mr. Hardy determined $x=1$, and $y=179$, as in the foregoing Table.

Mr. Robinson, of Biddick, put $x+y$ for the greater, and $x-y$ for the lesser Number ; whence he got, $x^2-y^2+2x=359$; $x^2+2x=359+y^2$; and $x=$

$\sqrt{360+y^2} : -1$; whence, by making $y=1$, he determined $x=18$, $x+y=19$, and $x-y=17$, but one Value in whole Numbers, his Theorem being more difficult than that before given.

Mr. Robert Langley determined several Values, but not all.

XIII. QUESTION 387, answered by Mr. Robinson of Biddick.
From the 5 Equations in last Year's Palladium is got as follows.

$$\begin{array}{ll}
 3-1 & 5 \sqrt{x-x} = b + \sqrt{v-w} \\
 2+3 & 6 \sqrt{x+x} + \sqrt{w} + 2v + 3w + 4y = 5 \\
 3+4 & 7 \sqrt{x+x} + 2v + 4w + 3y = r \\
 7-6 & 8 w - \sqrt{w} - y = g ; \text{ th. } y = w - \sqrt{w} - g \\
 2-3 & 9 \sqrt{w} - \sqrt{x-x} - w = d \\
 & 10 \sqrt{x+x} = \sqrt{w-w} - d = r - 2v - 3g - 3\sqrt{w-w} \\
 & 11 v = r + d - 3g - 4\sqrt{w} = m - 4\sqrt{w} \\
 7 & 12 \sqrt{x+x} = n - w + 5\sqrt{w} \\
 & 13 \sqrt{x-x} = b - m + 4\sqrt{w} - \sqrt{m-4\sqrt{w}} \\
 3 & 14 k - w + 3\sqrt{w} - \sqrt{m-4\sqrt{w}} = 40.3166
 \end{array}$$

Hence, $w=5$, $y=3$, $x=11$, $v=21$, and $z=8$, answering, in the Alphabet, to WELCH, the Bridegroom's Name.

Mr. W. Hardy, of Cottingham School, answers the same as follows : By using a Table of the Square Roots of the Places of the Letters of the Alphabet.

Sq. Roots.	Sq. Roots.	Sq. Roots.	Sq. Roots.
$a=1$ 1.	$g=7$ 2.6457	$n=13$ 3.6055	$t=19$ 4.3589
$b=2$ 1.4142	$h=8$ 2.8282	$o=14$ 3.7416	$u=20$ 4.4721
$c=3$ 1.7321	$i=9$ 3.	$p=15$ 3.8729	$w=21$ 4.5825
$d=4$ 2.	$k=10$ 3.162	$q=16$ 4.	$x=22$ 4.6904
$e=5$ 2.2359	$l=11$ 3.3166	$r=17$ 4.1231	$y=23$ 4.7958
$f=6$ 2.4494	$m=12$ 3.4641	$s=18$ 4.2426	$z=24$ 4.8990

1st Equation $\sqrt{v+w+x+y+z} = 31.5825$

2 $v + \sqrt{w+x+y+z} = 25.2359$

3 $v+w + \sqrt{x+y+z} = 40.3166$

4 $v+w+x + \sqrt{y+z} = 46.732$

5 $z = v+y$

By Question.

In 1st Equation the Decimal .5825 you find in Tab. against $21=w$,
2d Decimal .2359 against $5=e$. The 3d Decimal .3166 against $11=l$.

The
The
4th

4th Decimal .732 against $3=c$; and $5+3=8=b$; hence the Name of the Bridegroom is easily found to be WELCH; which, by common Methods, is a Herculean Labour. W. W. R.

N. B. The above Table will solve other Questions of the like Kind.

In 1st Question y is found $=14=0$, which put instead of y in two of the Equations, (suppose 1st and 3d,) then we have $x+z=22$, and $xz=85$; Hence $zz-11z=-85$; and $z=\pm 6+11=5=e$; and $x=17=r$, and Name ROE.

Mr. W. Pen, of Chalfont, answered it, and Mr. J. H. of Lewes.

Mr. Alexander Rowe says, in Answer,

Alas, poor WELCH! one Crutch will never do;
Now, wed to Youth, you must make Use of two.

On Miss Podmore's Answer.

Miss Podmore, by having a beautiful Mind,
In balting a great Satisfaction does find;
Who thinks that a Damsel of delicate Air
By more of his Company better will fare.
While Rakes run away, and their fair ones deceive,
Poor WELCH cannot stir without asking of Leave.

PALLAD. AUTHOR;

Mr. John Eadon of Sheffield answered it like Mr. Hardy; as also Mr. Stephen Hartley, and Mr. Jonathan France, by another Method.

Miss Polly Stow's Answer.

Though he halts with a Crutch, and he has got a Warp,
He may keep Time to Music upon the WELCH Harp.

Mr. Swift's Answer.

Were WELCH wed to some, they would soon let him know,
That he stands no more Chance—than with brisk Polly Stow.

XIV. QUESTION 388, answered by Capt. Williams of Woolwich.

LET $n=\frac{3}{2}$, $m=\frac{2}{3}$, $r=\frac{1}{4}$, $s=\frac{1}{3}$, $a=2046$, and x = the No;

sought,

$$\text{Then, } \frac{x^n - x^m}{x^r} = \frac{x^s}{a}; \therefore x^{a-r+s} - x^{m-r+s} = \frac{1}{a}; \text{ whence}$$

x may be determined, and, in this Case, must be less than 1.

Mr. Thomas Robinson of Biddick answers thus,

PUT, $x^4 = b = 2046$.

$$\frac{2\sqrt{x^{12}} - \sqrt{a^8}}{4\sqrt{a^4}} = \frac{3\sqrt{a^4}}{b}; \text{ th. } \frac{x^6 - x^2}{x} = \frac{x\sqrt{x}}{b}. \text{ Hence, } 63x^{12} =$$

$3b^3x^8 + 3b^3x^4 - x = b^3$; whence the Value of x may be had, and thence x^4 = Number required.

Mr. W. Hardy's Solution.

LET x = Number sought, and $z = 2046$.

$$\text{Then, } \frac{z^{\frac{3}{2}} - x^{\frac{2}{3}}}{x^{\frac{1}{4}}} = \frac{x^{\frac{1}{3}}}{z} \text{ by Quest. Th. } z \times x^{\frac{3}{2}} - x^{\frac{2}{3}} = z^{\frac{7}{2}}; \&$$

$a \times x^{\frac{1}{12}} - x^{\frac{1}{12}} = x^{\frac{7}{12}}$. If $x = x^{\frac{1}{12}}$, then, by Substitution, $a \times x^{\frac{1}{12}} - x^{\frac{1}{12}} = x^{\frac{7}{12}}$; th. $x^{\frac{1}{12}} - x^{\frac{1}{12}} = \frac{1}{a}$, from whence x , and consequently y may be found.

Mr. Draper reduces the Conditions to $x^{\frac{1}{12}} - x^{\frac{1}{12}} = a = \frac{1}{2946}$.

Mr. J. H. of *Lewes* finds $x = 1.000584$, true (he says) only to 5 dec. Places, because he did not find x exact in $x^{\frac{1}{12}} = x$; whose Equation was $x^{\frac{1}{12}} - x = \frac{1}{a} = .000488758$; where he finds $x = 1.000049$, nearly.

Mr. Alex. Rowe finds $x = 1.000326$, &c. — Some Answers sent not wrought out, and therefore rejected. Mr. Robert Langley, 1.000586521.

XV. QUESTION 389, answered by Mr. W. Hardy of Cottingham.

GIVEN $3^x = \text{Base}$, and $4^x = \text{Hypotenuse}$; then, (47. c. 1.)
 $\frac{4^{2x} - 3^{2x}}{4^{2x} - 3^{2x}} = \text{Perp.}$ But $\frac{4^{2x} - 3^{2x}}{4^{2x} - 3^{2x}} \times 3^x = 116$. Now, by Trial and Error, if $x = 2$, the Error is 3.16 too much; again, if $x = 1.95$, the Error is 11.57 too little.

Errors, unlike, Addition use;

But, when alike, Subtraction chuse.

Th. $\frac{2 \times 11.57 + 1.95 \times 3.16}{3.16 + 11.57} = 1.99 = x$, which is exceedingly near.

Th. the Sides are 15.7798; 13.0292; and 8.9016 Chains. W. W. R.

Answered by Mr. Robinson of Biddick.

PUT $x = 2$, then will the Hypoth. = 16, and Base = 9, and, by 47. c. 1., the Perpendicular 13.228, and Area $59.526 - 58 = 1.526$, Error too much.

Again, putting $x = 1.99$, by Tab. Log. and Trial, the Error is 0.001543 too little. Hence, $x = 1.99001$; then the Base 8.907; Perp. 13.02; and Hypoth. 15.78; nearly. W. W. R.

Mr. Draper's Process was without Numbers.

Mr. Pen of Chalfont's Numbers were, 8.90225; 13.03038; 15.78103; by Trial and Error.

Mr. J. H. of *Lewes* answered it by Trial and Error. Mr. Al. Rowe finds 8.9017 = Base; 13.0295 Perp. and 15.78 Hypoth.

Some Correspondents say from which Equation x is found, but did not find it; which was to be done.

Mr. Eadon's Numbers were, 8.8871 Base, 13.008 Per. and 15.78 Hypoth., by a proper Process. Mr. Stephen Hartly solves it, by the same general Method. Mr. Jonathan France makes 9 Ch. Base, 13 Perp. and 16 Hypoth. in whole Numbers.

Mr. Robert Langley makes the Base 8.90226073, and Perpend. 13.03031 Chains.

XVI. QUESTION 390, answered by Capt. Williams, of the Royal-Artillery, Woolwich.

LET x = the Height required ; $a = 1142$ Feet = Velocity of Sound in a Second of Time ; and $n = 16\frac{1}{12}$ Feet. Then will $\frac{x}{1142}$ = Time of the Sound's Passage ; and, by the Laws of Gravity, $x^2 : a^2 :: n : \frac{a^2}{n} = 81087.9171$ Feet = 15.358 Miles, required.

The same answered by Mr. Hardy of Cottingham-School.

LET $a = 16\frac{1}{12}$, t = Time of Descent, and $b = 1142$ ft. then $at^2 = bt$; th. $t =$

$\frac{b}{a} = 71\frac{1}{193}$ Seconds ; and $81087\frac{177}{193}$ Feet high, being the same as by

Capt. Williams. W. W. R.

Mr. Robinson's Solution agrees with both the former ; he making it 71 Seconds in falling to the Earth ; and the Cannon's Height, above the Earth's Surface, 15 Miles 626 Yards, required.

Mr. Draper's Answer is 81076 Feet.

Mr. R. Judson of Beverley answered the same correctly, 81087 Feet.

Mr. J. H. of Lewes answered it. Mr. Al. Rowe finds 81087.9172 Feet, = 15.357 Miles ; and the Time 71 Seconds.

Mr. Sadler answered, 81076 Feet and 71 Seconds. Mr. Eaden, $71\frac{1}{193}$

Seconds, 81088 Feet, by a proper Process. Mr. Stephen Hartley and Mr. Jonathan France solved it.

Mr. John Eaden observes the Question to be like Mr. Emerson's 1st physical Problem, p. 475 of his *Algebra*, and his Solution was the same. He considered it on different Principles, viz. the Gravity of the Body, taking Place whence it fell, and near the Earth, to be different, which were considered the same. Whence he finds 5417531299 Feet from the Surface.

XVII. QUESTION 391, answered by PHILO-PALLADIUM.

THE Expression $x^3 - x^2$ has two Minimums and two Maximums. One Minimum when $x = 1$, making the Expression vanish ; and one Maximum when $x =$ Infinity, or an indefinitely great Quantity ; the greater which Value of x , the greater will be the Difference of the two Powers. The other Mini-

mum is when $x = 0$, when x^3 , and x^2 , each = 1, and consequently the Expression vanishes. The other Maximum, (not Minimum,) here sought, lies between $x = 0$, and $x = 1$. Taking the Log. Difference of Sum of two Powers greatest, or least, when their Dif. or Sum is greatest, or least, put L. $x =$ Hyp. lx ; then the Maximum reduces to L. $x \times 3x - L. x \times 2x$,

viz. L. $x \times x$. In Fluxions, $\frac{x}{x} \times x + x L. x = 0$.

G

Hence

Hence, by Reduction, $L. x = -1$, which multiplied by .4342948 = com. Log. — .4342948 = com. Log. $\overline{1.5657052}$, whose Natural Number = .3678791, &c. = x , required. The same as the Value of x , when x^x is a Minimum; or of x , when $x^{3x} + x^{2x}$ = a Minimum; between $x = 0$ and $x = 1$. Then x^{3x} or x^{2x} = a Minimum.

Mr. Alexander Rowe of Cornwall, and Mr. Robert Langley of Hitchin, answered the above Question, exactly in the same Number for x , as did Mr. J. Fon. Mr. Robinson of Biddick came to the same Conclusion of the Hyp. $L. x = -1$, observing the vanishing, when $x = 1$, and that therefore the Expression must be a Maximum, but mistook in finding the Number answering thereto; making it 2.71828, which is when the Hyp. Log. = +1, (not — 1,) being when $\frac{a}{x}$ is a Maximum.

Our other Correspondents, in general, put the Expression into Fluxions, as if x were a constant, which is a variable, Quantity, (egregious Mistake!) making it $3x \times x^{3x-1} \dot{x} - 2x \times x^{2x-1} \dot{x} = 0$, whence they get, by Reduction, $x^x = \frac{2}{3}$, which is no Answer. And some, by a worse Mistake,

determine $x = \frac{2}{3}$; which is when $x^3 - x^2$ = a Maximum; for when $x = 1$, $x^3 - x^2 = 0$.

Since the Exponents $3x$ and $2x$ (of the Quantity x) are variable, and flow, where they are made constant, let them try what to make of the Fluxion $\overline{x + x} 3x + 3\dot{x} - \overline{x + x} 2x + 2\dot{x} = 0$, if they mean to put the Expression so in Fluxions, instead of the Way they have done it.

XVIII. QUESTION 392, answered by the PALLADIUM-AUTHOR.

The *sidereal* Time being Nothing more than the Right-Ascension of the *Mid-heaven*, at any *solar* Time of the Day, or Night, turned into Time, there is Nothing more to do than to find R. A. of the *Sun* at Noon, and of the *Moon* at her *Southing*, the same Day, for the *sidereal* Times required.

By *Naut. Eph.* 1769, Aug. 12, Noon, *Sun's* R. Asc. in Time $9^h 59^m 17^s$; the *sidereal* Time at Noon, the Clock set to *Aries*. First Answer required.

To find the Time of the *Moon's* *Southing* the same astronomical Day.

		Sun's R. A. D.R.A. in Time.		
By <i>Naut. Eph.</i> Aug. 20, Noon	Midnight	$9^h 59^m 17^s$	$3^o 4'$	$12^m 16^s$
		10 1 8	9 31	38 4
For 12^h Dif.		1 51	6 27	25 48
				— 1 51 in Deg. $27^{\circ} 45''$

Moon fr. *Sun* in 12 Hours 23 57

From

From Moon's R. A. Noon $0^h 12^m 16^s$ } As 12^h to $23^m 57^s$ fo $14^h 13^m$
 Take Sun's R. A. Noon $9^h 59^m 17^s$ } to $28^m 22^s$

Rem. near Ti. Moon's Southg. $14^h 12^m 59^s$ } As 12^h to $1^m 51^s$ fo $14^h 41^m$
 Add $28^m 22^s$ } to $2^m 16^s$
 9^h 59^m 17^s

Tr. Ti. D's Southg. Aug. 20, 14 41 21
 Add 10 1 33 ☉'s R. A. at D's Southg. 10 1 33

Sidereal Time at M. Southing 0 42 54 required. *Second Answer.*

In Degrees $10^\circ 43' 30''$ Moon's R. A. then.

10 57 31 } As 12^h to $60^m 27^s$ fo $14^h 41^m$
 N. B. $15' = 1^m$ Time Dif. 14 1 } to $70^m 53^s 31''$
 Answering $0^m 56^s$ } D's R. A. Aug. 20, Noon 3 4 0
 D R. A. at South. Sum 10 57 33

Hence the more accurate Determination requires an Interpolation, by second Differences, for 12 Hours.

N. B. To reduce Time into Degrees. Divide the Parts of Time by 4, for superior Denomination of Degrees, to be added together. — To reduce Degrees into Time, multiply the Parts of Degrees by 4 for inferior Denomination of Time, to be added together.

* * Multiply Degrees by 4, for the Time below in Name;
 And divide the Time by 4, for Degrees, above the same.

XIX. QUESTION 393, answered by Capt. Edward Williams of the Royal Artillery.

LET $p = 7854$; $AB = b$; Solidity $= s$; and

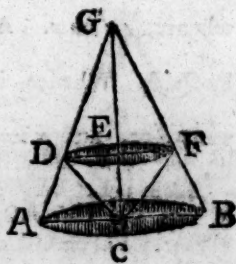
$DF = x$; then will the Alt. $GC = \frac{3^s}{pb^2} = a$.

By sim. $\Delta s b : a :: x : EG = \frac{ax}{b}$, $\therefore EC = a$

$-\frac{ax}{b} = \frac{a}{b} \times -x$. Consequently $px^2 + \frac{a}{3b} \times b$

$-x = M$. $\therefore 2bx\dot{x} - 3x^2\dot{x} = 0$, and $x = \frac{2}{3}b$; $\therefore EC = \frac{1}{3}GC$, and

$EG = \frac{2}{3}GC$; and therefore the Cone GDF = twice the Cone CDF.



The same answered by Mr. William Hardy, of Cottingham.

The Height of the given Cone is, $\frac{600}{2500} \times \frac{3}{,8754} = 0,9168$, an Impropriety given.

Put $b = .9168$; $d = 50 =$ Diameter of Base; and $x =$ Height of the inverted Cone.

By sim. $\Delta s b : d :: b - x : \frac{db - dx}{b} =$ Diam. of required Cone's Base.

By *Quest.* $b \times \overline{b-x^2}$ is a Maximum. Whence, by Fluxions, $x = \frac{b}{3} =$

0,3062 Height; and its Diam. of Base $= \frac{2d}{3} = 33,8$, required.

Mr. Robinson, of Biddick, answered it; as did Mr. R. Judson.

Mr. W. Pen of Chalfont, says Mr. Johnson, in *Pall.* 1765, p. 35, has demonstrated the Solution to this *Quest.* very elegantly.

Mr. Alexander Rowe observes, that the Solidity should have been printed 6000 instead of 600 Inches, when the Cone's Alt. $= 91,673$ Inches $= a$;

and when the Solidity Cone is a Maximum then $a - x \mid^2 \times x =$ a Maximum, in Fluxions and reduced, $x = \frac{1}{3}a = 30.55766$, and the inverted Cone's

Diam. of Base $= 33.33 = \frac{2}{3}b$; $b = 50$ In. Diam. bigger Cone's Base.

Mr. Sadler found the Cone's Alt. only.

Mr. Eadon makes Diam. required of the Cone's Base $= 33\frac{1}{3}$ Inches, Alt. 0,305566, &c. confirming Capt. Williams's Solution.

Mr. Atkinson of Ingham answered it, Mr. W. Pen, and others.

XIX. QUESTION 394, answered by Capt. Williams of Woolwich.

LET ACB be the right-lined Δ . Put the Hyp. $AB = x + z$, the Leg $BC = x$, and $AC = x -$

z . Then, by 47. e. 1. $x + z \mid^2 = x^2 + x - z \mid^2$,

whence, $4z = x$. Also $x^2 - x - z \mid^2 = \frac{432}{7}$,

by *Quest.* Whence, by Substitution, $z = \sqrt{\frac{432}{7}}$

$= 7.855$, and $x = 31.42 = BC = c$; $AC = A$

$23.565 = b$, and $AB = 39.275 = a$.
Again: Let DEF be the *Isoceles* Δ required. Produce the Perp. DH, till it cuts the Base AC, in G; then Δ s FEA, FHG, being *sim.* and $FH = HE$, $\therefore FG = GA = x$, and $CG = b - x$. Also the *sim.* Δ s CAB, CGD, FHG, give these Analogies.

$$a : c :: x : FH = \frac{cx}{a}; a : b :: x : GH = \frac{bx}{a}; b : a :: b - x :$$

$$GD = \frac{a}{b} \times b - x; \text{ th, } DH = \frac{a}{b} \times b - x - \frac{bx}{a} = a - x \times \frac{a^2 + b^2}{ab}$$

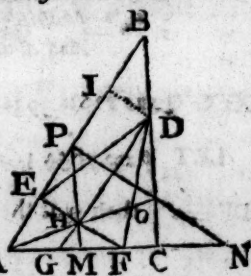
$$= a - x. \text{ But } DH \times HF = m \text{ (by } \textit{Quest.}) = a - x \times \frac{cx}{a}, \therefore ax -$$

$$2xx = 0, \text{ and } x = \frac{a}{2s} = \frac{1}{2}b \times \frac{a^2}{a^2 + b^2}. \text{ Hence, } DH = a - x = a -$$

$$\frac{1}{2}a = \frac{1}{2}a = \frac{1}{2}AB, \text{ and } FE = \frac{2cx}{a} = \frac{abc}{a^2 + b^2} = 13.86, \text{ and } DE =$$

$$\frac{1}{2}\sqrt{AB^2 + FE^2} = 20.88. \text{ From this Solution arises the following Construction.}$$

Bisect



Bisect the Hypoth. AB in P, and draw PN, PM perp. to AB, AC, cutting AC (produced if necessary) in N and M. Bisect PN in O, and join AO, cutting PM in H; through which draw PHM, DHD parallel to BC, BA, respectively, and terminating in the Sides of $\triangle ABC$. Lastly, join DE, DF, and DEF will be the Triangle required. — This is evident from the Construction; for the Figure BPHD is a Parallelogram, therefore $DH = BP = \frac{1}{2} AB$. The $\triangle APN$, AEC , are sim. and AO bisects PN, $\therefore EH = HE$; and because DH is parallel to AB, and EF to PN, the Angle DHE is right. $\therefore \triangle EDC$. Rem. If the Vertex D be posited in the lesser Leg AC, the Base EF will be

$\frac{abc}{a^2 + c^2}$, and $c - \frac{abc}{a^2 + c^2}$, the Base of that \triangle , will be less than this, EF;

therefore, as the Perp. DH is always $= \frac{1}{2} AB$, the $\triangle DEF$ is the greatest possible, when it has its Vertex D in the greater Leg BC.

Mr. W. Hardy of Cottingham-School answered it in a similar Manner, as did Mr. Robinson. — Mr. Sadler finds the Side of the Isosceles Triangle $= \frac{1}{2}$ Hypoth. as it is, by a fluxional Conclusion from a Maximum. — Mr. John Eadon, Math. Master of Sheffield-School, by a fluxional Process, with a true Fig. like Capt. Williams's, makes the Base $= 11.7829$, &c. and Perpendic. 24.544 , &c. of the required Cone. — Quare. — We with our Correspondents would be as correct as possible in their Answers, to save Trouble of examining Solutions, and prevent their Trouble being thrown away, when Comparisons coincide, or are found to agree.

XXI. QUESTION 395, answered by Mr. Robinson of Biddick.

$79\frac{1}{3} \times 282 = .7894 = 28447.7463$ solid In. $= m$, $b = 10$, $x =$ Head Diam. $x + b =$ Bung. $x + 2b =$ Length of Cask. Then $x^2 =$ Sq. Head

Diam. $x^2 + 2bx + b^2 =$ Sq. Bung Diam. $\sqrt{x^2 + 2bx + b^2} =$ mean Diam. between the Head and Bung. Now, by Theorem 58 of Fletcher's Universal

Measurer, p. 254, $2x^2 + 2bx + b^2 + 4x^4 + 8bx^3 + 4bx^2 \times \frac{x + 2b}{b} = m$. This

Equation being resolved, the Cask's Dimensions may be found.

Mr. Hardy rejects the Solution to this Quest. as admitting of an infinite Variety of Answers. — Mr. A. Rowe puts $2a = 10$ In. (Excess of Dimensions,) $c = 79\frac{1}{3}$, $= 79.23076923$ Ale Gall. Content of the Cask; $x =$ Head Diam. Then, by Quest. $x + 2a =$ Bung-Diam. $x + 4a =$ Cask's Length, and let $x + a =$ Diam. in Middle, between Bung and Head, (which will be very near when the Curvature there is but small.) Whence, (by a

general Rule in Mof's Gauging, p. 175,) we have $\frac{6x^3 + 36ax^2 + 56a^2x + 32a^3}{2154.32}$

$= c$. Reduced, $x^3 + 30x^2 + 233.33$ &c. $x = 27781.405127929$. Solved, $x = 21.1377$, &c. $=$ Head Diameter, and Bung Diam. $= 31.1377$, Cask's Length $= 41.1377$ In. required. — Mr. Rowe thus, like a Workman, has brought out the Numbers.

N. B. Some Correspondents gave an Equation of the Curve, and gave the Answer by finding the Solidity of the Cask by Fluxions, equating it to $79\frac{1}{3}$ Gall. given. — But the given progression of the Head, Bung, and Length, viz. 10 In. will afford no general Equation of the Curve; and therefore such Answer is not true; for this is to consider the Cask under a given Form, which is not given.

XXII. QUESTION 396, answered by Mr. W. Hardy of Cottingham.

IN an equilateral Triangle, whose Side is $= 1$, the Perp. $= .86602$. Such an equilateral Triangle, divided by a Perp. falling from an Angle to an opposite

Site Side, makes 2 right-angled Triangles, each similar to the required Triangle; the Sum of which Sides will be $1 + .5 + .86602 = 2.366$, &c. but the Sum of the Sides of the required Triangle is 4732.

Therefore, $\left\{ \begin{array}{l} : 1 \\ : .5 \\ : .866 \end{array} \right\} :: 4732 \left\{ \begin{array}{l} : 2000 = \text{Hypotenuse} \\ : 1000 = \text{one of the Legs} \\ : 1732 = \text{other Leg} \end{array} \right\}$ of the Triangle required.

Mr. R. Judson, of Beverly, solves it in the same Manner. — Mr. Robinson of Bridick solved it in the same correct Numbers; but from a more difficult Process. — Capt. Williams of Woolwich, by a trigonometrical and analytical Process, solves the same Quest. whose Solutions are all masterly. — The Proposer answered the same correctly — Mr. Draper's Conclusion is not true.

Mr. Alexander Rowe answered the same Question very judiciously, and observes, that the given Ratio of the Angles at the Base is superfluous.

We would have some of our Correspondents compare their *prolix* Solutions, not wrought out in Numbers, with what is done above, and try to mend their Hand.

XXIII. QUESTION 397, answered by Capt. Edward Williams of the Royal Artillery.

PUT g = Gallons first in the Cask, a = Gallons drawn off at each Exhaustion; and x = the remaining Liquor in the Cask after any Number of Exhaustions.

Then, $g - a$ = 1st Remainder; and since the Quantity of Liquor is as the Space it possesses, it will be, $g : g - a :: g - a : \frac{g - a^2}{g}$ = 2d Remainder

$1 : \frac{g - a^2}{g} :: \frac{g - a^3}{g^2} = 3\text{d Remainder} :: \frac{g - a^4}{g^3} : \frac{g - a^5}{g^4} = 4\text{th Remainder}$

der; whence the 20th Remainder will be $\frac{g - a^{20}}{g^{19}} = x$. $\therefore 20 \times \text{Log. } g - a$,

$- 19 \text{ Log. } g = \text{Log. } x = 20 \text{ Log. } 119 - 19 \text{ Log. } 120 = 2.0064972 \text{ Log.}$ answering to the natural Number 101.50728 Gallons remaining after the 20th drawing off, required.

Mr. Hardy, of Cottingham, answered in the same Manner, and also Mr. Robinson.

Mr. R. Judson, of Beverly, finds the Gallons left 101.14; Mr. Draper, 101.508. Mr. William Turner, Writing-Master and Teacher of Mathematics at Witney, Oxfordshire, 101.509. Mr. William Pen, 101.50689, &c. Mr. Alexander Rowe, 101.51. Mr. Sadler, 101.5085. Mr. Stephen Harileg, 101.5082. And Mr. Jonathan France solved it.

XXIV. QUESTION 398, answered by Capt. Williams, of Woolwich.

PUT the Radius of the Bushel = $R = 9.25$ Inches; the Height = $8 = a$; Diameter of one of the under Globes = d , and Diameter of the upper Globe

= x . Then will $d = \frac{2R}{1 + \sqrt{\frac{3}{4}}} = 0.92821 R = 8.586$; the first Part of the Solution.

Again, if Lines be drawn from the Center of the upper Globe to the Centers of the three under ones, there will be form'd a Pyramid whose slant Side =

$\frac{d+x}{2}$, and the Radius of the Circle circumscribing its Base = $R - \frac{1}{2}d =$

$4.957 = p$; therefore if y = Altitude of the Pyramid, it will be $y^2 + p^2 =$

$\left| \frac{d+x}{2} \right|^2$, and $\frac{1}{2}d + \frac{1}{2}x + y = a$; hence $y = a - \frac{d+x}{2}$; and $y^2 = a^2 - a \times \frac{d+x}{2}$

$+ \left| \frac{d+x}{2} \right|^2 = \left| \frac{d+x}{2} \right|^2 - p^2$; $\therefore x^2 + p^2 = a \times \frac{d+x}{2}$, and $x = \frac{p^2}{a} + a - d$

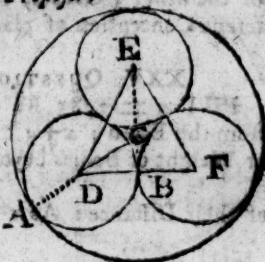
$= 11.699$, the Diameter of the upper Globe.

The same answered by Mr. Hardy, the Proposer.

THE Radius of the circumscribing Circle CA, ($= CD + DA$) being given $= 9.25 = a$, the Semidiameter of the Bushel, $x = CD$, and $y = DB$

$= \frac{x}{2}$; by 47. e. 1, $x^2 = \frac{x^2}{4} + yy$; $3x^2 = 4yy$;

th. $\frac{2y}{x} = \sqrt{3} = 1.732 = b$, by Substitution.



Then $x = \frac{2y}{b}$. But $x = a - y$; $\therefore \frac{2y}{b} = a - y$,

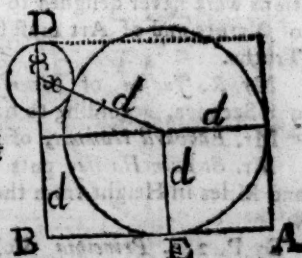
and $y = \frac{ba}{2+b} = 4.292 =$ the Semidiameter of one of the Bottom-Globes;

whose Diameter is $= 8.584$ Inches.

For the Diameter of the upper Globe. If $BD = 8 = b$ Depth of the Bushel, $d = 4.292$, the Semidiameter of the Bottom-Globes; $AB = a$, the Semidiameter of the Bushel $= 9.25$; $BE = a - d = 4.958 = c =$ the Semidiameter

of the upper Globe. By 47. e. 1. $\left| \frac{d+x}{2} \right|^2 - c^2 \left| \frac{1}{2} \right|^2$

$= b - x - d$; whence $x = \frac{b^2 + c^2 - 2bd}{2b} =$



$1.11936 =$ the Semidiameter of the upper Globe,

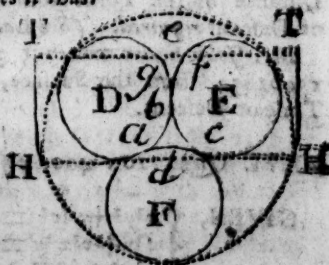
whose Diameter is $= 2.23872$ Inches. W. W. R.

Mr. Robinson, of Biddick, finds, by a similar Method to Mr. Hardy's, the Diameter of the under Globes $= 8.585$ Inches; and the Diameter of the upper Globe $= 2.65608$ Inches.

Mr. R. Judson, of Beverly, by a similar Method to Mr. Hardy's, finds the Diameter of the three under Globes $= 8.586$ Inches; and Diameter of the upper one $= 2.485$ Inches; differing from Mr. Hardy and Mr. Robinson in the latter.

Mr. Alexander Rowe solves it thus.

IT is demonstrated, that the Diameter of a Circle circumscribing three equal ones, is to the Diameter of each of the inscribed Circles, as 2.1547 to 1 . Whence, As $2.1547 : 1 :: 18.5 : 8.5858827 =$ Diam. of each Globe, D, E, F. — Moreover, it is evident (by Fig.) that the internal Space, $abcd$, at the Bottom of the Bushel, would be similar and equal to that of bcf at the Top, had the Diameter of each inscribed Globe been equal to H



T, the Height of the Bushel; but the Difference being $(= 8.385881 - 8)$

$\equiv 0.585882$. And the Difference of the Semidiameter of the circumscribed Circle or Buſhel, and the Diameter of each Sphere is $\equiv 0.664118$. Whence

$$.664118 + \frac{.585882}{2} \times 2 = 1.718824 \text{ Inches, the Diameter of the Globe}$$

g. W. W. R.

Mr. *John Eadon* finds the Diameter of the 4th Globe $\equiv 1.7246$; and that of the other 3 Globes, 8.5858, &c. differing from other Solutions, by a different Conception of placing them.

XXV. QUESTION 399, answered by Mr. Robinson of Biddick.

PUT $a = 3985$ Miles, the Earth's Radius; $x =$ Distance of the Ball from the Earth; $x+a =$ Dist. Earth's Center: Then the Force of Gravity, or Weight of Bodies beyond the Earth's Center, is, reciprocally, as the Squares of their Distance: As $x^2+2ax+a^2 : a^2 :: 2 : \frac{2}{3}$; th. $x^2+2ax+a^2 =$

$2a^2$; and $x = a\sqrt{\frac{2}{3}} - a \equiv 2917.2192$ Miles above the Earth's Surface; through which Space the Ball will descend to the Earth in 16.31 Minutes, required.

Mr. *Hardy* sends two Solutions; in his 1st, he determines the Time of Descent in Seconds $\equiv 15^s 5$; in his 2d Solution, 1690 Seconds; allowing the Earth's Semidiameter to be 2100000 Feet. But such Difference of Solutions were never designed to take Place in our *Palladium*; So that the *Laws* of Nature and of Art must be better settled before we give them for undoubted Truths.

Mr. R. *Judson*, of *Beverly*, determines the Time of Descent $16^m 18^s \equiv 978$ Seconds, according to his Method of Solution.

Mr. *Edward Hummet*, of *Whitechurch*, sent a *Process* but no Numbers.

Mr. *Stephen Hartley* puts $r =$ Earth's Radius $\equiv 4000$ Miles; $a = 2$ lb. and Miles in Height from the Earth's Center $\equiv x$.

By P. 219, *Principia*, Vol. II. and by *Question*, $x^2 : a :: r^2 : \frac{2a}{3}$; Th.

$$\frac{2x^2}{3} = r^2, \text{ and } x^2 = \frac{3r^2}{2}, \text{ whence } x = r\sqrt{\frac{3}{2}} = 4894.98 \text{ Miles;}$$

from which take 4000: rem. 898.98, the Height. Then, $16\frac{1}{2}$ Feet : Se-

cond :: $898.98 \times 1760 \times 3$ Feet : Square Seconds; whose square Root is $543^s.25 \equiv 9^m 3^s.25$, Time, required.

Mr. *Alexander Rowe* finds 895.608, &c. Miles $\equiv 4728810.38784$ Feet, Distance of the Point from the Earth's Surface; and $10^m 13^s.5$, the Time of Descent required. (See *Ladies Diary*, 1754, P. 32, 33.)

Mr. *John Eadon* makes it 36443634 Feet from the Earth's Center, and 15402834 from the Surface, whence the Ball descends, and $28^m 15^s.18$, Time of Descent.

XXVI. QUESTION 400, answered by Mr. William Roberts, of Greasbrough, near Rotherham.

$$\text{GIVEN, } \left\{ \begin{array}{l} x^3y^2 + x^3y^2 = 7830 = a \\ x^3y + x^3z^2y = 7830 = a \\ x^3x^2 + x^3z^2y^2 = 15606 = b \end{array} \right\} x, y, \text{ and } z^2 \text{ correcting the Data, viz. } [15606 \text{ for } 15600.$$

By

By 1st Equation, $x^3 = \frac{a}{y^2 + x^2}$, which being substituted in the 2d and 3d, gives $ay + ayx = ay^2 + ax$, and $ax + axy^2 = by^2 + bx$; and by exterminating x , we have $ay^2 - ay + ay^4 - ay^3 = by^3 - by$; which, reduced, gives $y^3 =$

$$1 + \frac{b}{a}y^2 + y = 1 - \frac{b}{a}. \text{ Solved, } y = 1; \text{ whence, } x = 3; \text{ and } x = 17;$$

and the Letters, constituting the Ladies Name, C A R.

Since Car I have found is the Name of the Fair,

That her Lovers admire for her Parts;

I therefore advise the young Men to beware,

How, for Trifles, they venture their Hearts!

Mr. J. H. of Lewis, gave the same Theorem and Answer.

Remark. By the 2 first Equations having equal Value, y must be $= 1$, because then they reduce to equal Value, viz. $x^3 + x^3x^2 = a$, and $x^3 + x^3x^2$

$$= a; \text{ and the 3d to } x^3x^2 + x^3x^2 = b; \text{ whence } x^3x^2 = \frac{b}{2}; \text{ which being}$$

put in the 1st and 2d Equation, either reduces to $x^3 = a - \frac{b}{2} = 27$; whence

$x = 3$, and $x = 17$, making CAR, as before.

Mr. William Hardy answered it in the same Manner. As also Mr. Alexander Ryce, Mr. Sadler, Mr. W. Ford, of Frampton upon Severn, and Mr. Stephen Hartley, who observed the printed Mistake.

Mr. Swift, of Tow, answers thus,

Beware how ye come near the Rays of Miss CARR,

Whose Eyes shine like Diamonds, or sparkling Star!

Mr. Thomas Atkinson, of Ingham, answered the same in elegant Verse in Praise of Miss Car; for which we are sorry we want Room.

Mr. W. Pen, of Chalfont, also answered it.

PRIZE QUESTION answered by the PALLADIUM-AUTHOR.

FROM the Moon's central Equation, in 2 Parts, (the 1st to the least Eccentricity, and 2d, the Evection, according to old Theory,) is shewn the Disagreement, betwixt the old and new Way of Solution of the same. The Argument of Evection (according to Mayer) 2. $\text{D} \hat{a} \odot - \text{D}$ Anom. answering to the Equation of Evection (deduced as in the Royal Astronomer, P. 372) gives a Nearness, when connected with the mean Central, to the whole Central; Which Defect is therefore supplied by Quantities thrown into other Equation-Tables, in the new Mode of finding the Moon's true Place.

The 1st Part of the Moon's central Equation, by the new Way of Solution, is according to a mean Eccentricity of the lunar Orbit, from the Argument of the uncorrected for mean Anomaly, (whereas the proper mean Anomaly of the Moon, like that of the Sun, should be determined by deducing the true Place of the Apogee, from the Moon's mean Place, as the Sun's true Apogee is deduced from his proper mean Anomaly), and the 2d Part of the same central Equation is according to an Evection-Equation, depending on the same uncorrected Anomaly (by omitting the 2d large Equation of the Moon's Apogee) when it is taken from 2. $\text{D} \hat{a} \odot$ for the Argument to obtain that Equation. — Hence, by the Computer's deviating from the Errors of the old Theory, he has others to combat with and correct in the new Theory. — But, by rectifying the Dimensions of the Epicycle, in which the Moon's Distance from the Sun is supposed (by the old Theory) to move double the Quantity of the mean Motion of the $\text{D} \hat{a} \odot$ (from the Conjunction

Mr. T. Atkinson of Ingham, making a *Mistake* in computing the last Year's Lunar Eclipse for Dec. 13, by applying the Equation of the mean to apparent Time with a wrong Sign, corrects it to

Beg. 13^d 4^h 57^m 12^s
End 13 7 45 28

N. B. For Moon's Pl. same, (last Year,) r. Moon in oppof. Pl.

Duration 2 48 16
Digits 80^o 54' 57"

M. Clark's Equation resolved, p. 61, *Pall.* 1769; viz. $\frac{80}{1} \times \frac{79}{2} \times \frac{78}{3}$,

&c. to x Terms, into $\frac{a-d}{a} \Big| x = \frac{1}{2}$, (where $a = 46$, $d = 20$), $= \frac{80}{1} \times$

$\frac{79}{2}$, &c. to x Terms, into $\frac{26}{46} \Big| x = \frac{1}{2}$. Here it is evident, when x the

Number of Terms $= 80$, the Expression reduces to $\frac{26}{46} \Big| 80 = \frac{1}{2}$, because all

the Factors then $= 1$; which is *impossible*. By a few Trials, x must be above 40; which (notwithstanding Mr. Clark's Abilities otherwise) must be *defective*.

N. B. 19, 19 $\frac{1}{2}$, or 20 Widows, out of 80 Wives to 80 Men, of 40 Years of Age each, will be living at the Age of 60 Years, or 20 Years after, as is generally answered.

At first 80 are all Wives, and no Widows, and the Widows are continually increasing, and the Wives decreasing. So that Wives and Couples, in the Solution of 35 Couples, are not the same Thing.

As the List of Names, sent us by our several Subscribers and Contributors to our Work, mentions not the particular Number of *Palladiums* they have subscribed for in each School and Academy, we can only thank them (and Mr. Sadler in particular) for their several intended Favours and generous Encouragement of our Work; which, with so much Aid, cannot fail of future Success.

* * Lately published, A Farte in two Acts, entitled, *The merry Miller, or Countryman's Ramble to London*. By Mr. Sadler of Whitchurch.

MOUNTAIN'S Prophecy.

Mr. Francis Mountain of Knarebro, Yorkshire, in a Letter dated Oct. 18, 1768, (whom we consider as *Amanuensis* to Mr. T. W—r) informs us, that the gravitating Power to the Sun gains so much of the centrifugal Force daily, that we may soon expect (upon more certain Grounds than Whiston's Prediction of the Millenium, which is past,) a final Dissolution of our System; by the Earth and her planetary Attendants being drawn into the Sun: Whence a Renovation of Worlds is expected by those who shall live to see it. — This Correspondent enquires when our *Astronomia Perfecta* will be published, like some other necromantic Enquirers, though he has predicted our World to be so near its Period, and though he and others are told, at the End of the last Page in our *Royal Astronomer*, that it will not be published till sufficient Subscribers are found to pay for the great Expence of printing that Work: When, and not before, it may be expected.

A celebrated Comet-Doctor in London has likewise predicted some extraordinary future Events, and made wonderful Discoveries concerning the Properties and Destination of the late Comet, passing by *Belatrix*, appearing for no trivial, but a portentous, End; being observed gibbous, dichotomized, and falcated!

N. B. He missed an Experiment, designed to prove whether the Tail of this Comet would do Hurt to our Earth, (by a Brush,) and to prove whether the

Comet was inhabited; which another *Connoisseur* in Comets was happy enough to prove, by an infallible Experiment, taken in the *Nick* of Time, assuring us, that this very Comet was inhabited by *Salamanders* of two Legs. This Comet-Doctor, in the *Ledger*, Sept. 16, 1769, is said to have taken the *Astronomer-Royal's* Office out of his Hands, by a forward Diligence.

To compute the Moon's Orbit-Place, by three Equations. According to the old lunar Theory.

Precept 1. Find the Sun's true Place to the mean Time given.

2. To the given mean Time collect the mean Places of the Moon's Longitude, Apogee, (or Anomaly,) and Node.

3. With her mean Anomaly for Argument, (uncorrected, by 1st and 2d Equation of her Apogee,) enter the Tab. of her elliptic Equation, and take out that Equation, subtracting or adding, according to the Sign marked. Apply this elliptic Equation to her mean Long. and Anom. for the given mean Time, and you will have her Long. and Anom. 1 equated.

4. From 1 equated Anom. sub. the Sun's true Place, and you will have the Moon's Dist. from the Sun. With which Dist. as an Arg. take out the Moon's Variat. Equat. or Reflect. from Tab. p. 63 which apply to the before 1 equated Moon's Anom. according to the Sign in Tab. for her Anom. 2 equated.

Find the Moon's synodical Anomaly thus.

5. The Moon's Dist. fr. Sun being between 0 and 3, or 6 and 9 Signs, (in her passing from a Conjunction, or Opposition, to a Quadrature with the Sun,) sub. that Dist. from 3 or 9 Signs, respectively, and add the Rem. to the Moon's 2 corrected Anom. for her synod. Anom. req. But, her Dist. fr. Sun being between 3 and 6, or 9 and 12 Signs, (in her passing from a Quadrat. to an Oppos. or Conjunction, with the Sun,) sub. the Excess of her Dist. above 3 or 9 Signs, respectively, fr. her 2 corrected Anom. and the Rem. will be her synod. Anom. universally. Or sub. the Dist. of the Moon fr. the Sun from the following or preceding Quadrat. and add the Rem. to \mathcal{D} 's 2 corrected Anom. and the Sum will be her synod. Anom. universally. Because if $Q =$ Signs of Quadrat. $D =$ those of Dist. \mathcal{D} fr. \odot , and $A = 2$ cor. Anom. Then $Q - D + A = S$, syn. Anom. in 1st Case; and $D - Q =$ Dist. fr. a Quadrat. in 2d Case, to be sub. fr. A in said Case. Therefore here $A + Q - D = S$, as bef. Take $\frac{1}{2}$ this syn. Anom. & set it under the Whole.

6. Take out Log. Sine (fr. Tables) to Dist. of \mathcal{D} fr. \odot , and add it to Log. of Diam. ($4369\frac{1}{2}$) of the Circle of Evection, viz. 3.640432, (rejecting Radius) for the Log. of the Chord of Evection.

7. Take out (fr. Tab. 3.) Log. of \mathcal{D} 's Dist. fr. Earth, according to her mean Anom. and sub. it fr. Log. of Chord of Evect. and to Rem. add Rad. for Tang. of an Arch, fr. which sub. 45° . Then say, As Rad. : Tang. remaining Arch :: Tang. $\frac{1}{2}$ \mathcal{D} 's synod. Anom. : Tang. Arch, whose Dist. from $\frac{1}{2}$ syn. Anom. is Equat. or \angle of Evect. which, when syn. An. is less than 6 Signs, subtracts, but, if more, adds to \mathcal{D} 's last corrected Place.—This Equat. of Evect. applied to 2 equated Long. will give \mathcal{D} 's Long. in her Orbit, in all Cases, nearly, but not correctly.—N. B. In 8 or 6 of \mathcal{D} & \odot Variat. or Reflect. Equat. vanishes. Then 1st Part of \mathcal{D} 's central Equat. to her least Eccentricity being connected with 2d Part or Evect. Equat. will be complete centr. Equat. \mathcal{D} having then no other than these 2 Equat. according to the old Theory, which comes near the Truth, giving her Orbit Place somewhat dif. fr. the whole central, accord. to the Newtonian Theory: For in that Theory not only 1st, but 2d larger Equat. of \mathcal{D} 's Apogee, is introduced; which, in the old Theory, are omitted. Tho' it must be confessed, that by a correct Apogee of \mathcal{D} (as of \odot) the proper Mean Place of \mathcal{D} is ascertained, by Subtraction: whence the Equat. of an elliptical Orbit (according to a certain Eccentricity) is determined by known Rules.

COMPUTATION

EXAMPLE.

COMPUTATION of the Moon's Orbit-Longitude, by three Equations, According to the Old Lunar THEORY. For the Year 1725, Dec. 5^d 9^h 5^m. O. S.

	☉ M. Anom.	Sun's Apogee.	Sun's true Place.
	8 0 1 "	8 0 1 "	8 0 1 "
Greenwich, O. S.	5 17 15 9	3 8 10 3	8 24 59 6
	☽'s mean Pl.	Moon's mean Apogee.	Mean ☽ Retrog.
1725	8 19 38 4	7 24 53 18	1 13 12 12
December 5	4 26 47 52	1 7 46 2	17 57 17
Ho. 9	4 56 28	2 30	1 11
Min. 8	4 23	2	1
Sec. 5	3	0	17 58 29
1 Eq. ☽ Center	1 21 26 50	— 9 2 41 52	0 25 13 43
	— 3 22 57	1 21 26 50	Eq. add 1 40 51
☽ 1 equated	1 18 3 53	4 18 44 58	
☉ true Pl. sub	— 8 24 59 6	☽ m. An. Arg. Eq. Center	83 0 26 54 34
		— 3 22 57	
Rem. ☽ à ☉	4 23 4 47	4 15 22 1	Con Lo. Dia. Log ^s .
		Variation — 26 4	Circ Evect. 3.640432
2. Equat. ☽	— 36 4	4 14 45 57	AddS. ☽ à ☉
☽ 2 equated	1 17 27 49	☽'s 2. corrected Anom.	143° 4' 47" 9 778659
3. Eq. ☽ Evect.	— 33 32	Exc. — 1 23 4 47	Log. Chord
☽ 3. eq in Orbit	1 15 54 17	☽ à ☉ above 3 ^s sub.	Evect. sub. 3.449091
		Syd. A. 2 21 41 10	Fr. Lo. ☽ à ☉
☽ subtract	0 26 54 34	1, 1 10 50 35	Ar. ☽ m. an. 4.077595
Ar. La. or ☽ à ☉	0 18 59 43		Lo. Tan (+
☽'s Lat. N.	1 39 30	N.B. ☽ à ☉ Dist. fr. the	Radius) 11.558504
Reduction	— 4 9	next follows or preceding	of 88025'
☽ Pl. in Eclipt.	1 15 50 8	Quadrature, always adds	Sub. 45
Observ'd Halley	1 15 42 12	to the ☽ An. 2. cor. for her	Rad.
		synodical An. Or, which	Ta. 43 25..9.975985
		is the same, it sub. fr. ☽ 2.	Ta. syn. An.
P. 54. Royal Aß. Error — 8 20		cor. An. going fr. a Qua-	40° 50' 35" 9.936759
Halley's Tables.		drature, what it is above,	Tan. sub.
☽ Lat. obs. Halley 1 38 37		going from it; or adds to	39 17 3..9.912744
Computed above 1 39 30		☽ An. 2. correct'd what it	
		wants of that Quadrature,	1 33 32 — ☽'s E-
Error — 0 53		going to it.	vect. Equation.
		Next preceding Qu. 3 ^s .	
☞ Oversight in P. 45. l. 5.		Ex ☽ à ☉ — 4 23 4 47	N. B. When synod.
fr. Bot. Read, Tho' there are se-		Wnts of 3 ^s 10 6 55 13	An. { less } than
veral Exceptions of that Division		☽ A. 2 c. — 4 14 45 57	{ greater } 61
and Progression, and but 1 only, or		Syn. Anom 2 21 45 10	Moon's Evect. - E-
14, an even No. as appear fr. all		[as before.]	quation { sub. }
the Values of x and y following.			{ add }

N. B. The following Logarithms of the Moon's Distance from the Earth, are according to Street, copied by Leadbetter in his Tables. Who has made some Amendment of Street's central Equation, according to the least Eccentricity; as an Amendment may still be made of Leadbetter's Variation-Equation, by altering the Argument to single instead of double Distance of ☽ from ☉, as we have performed.

TABLE

TABLE I. The MOON's Central EQUATION, for her least Eccentricity.

Argument. Moon's mean Anomaly.									
	Sig. 0. —	Sig. 1. —	Sig. 2. —	Sig. 3. —	Sig. 4. —	Sig. 5. —			
00	00 0' 0"	20 23' 32"	40 12' 20"	40 57' 42"	40 23' 30"	20 34' 42"	300		
1	0 5 0	2 27 54	4 15 4	4 57 52	4 21 2	2 30 5	29		
2	0 9 58	2 32 14	4 17 36	4 57 54	4 18 24	2 25 22	28		
3	0 14 56	2 36 32	4 20 10	4 57 56	4 15 44	2 20 38	27		
4	0 19 54	2 40 44	4 22 36	4 57 50	4 12 56	2 15 50	26		
5	0 24 54	2 45 0	4 24 58	4 57 42	4 10 8	2 11 2	25		
6	0 29 52	2 49 8	4 27 14	4 57 24	4 7 10	2 6 8	24		
7	0 34 41	2 53 14	4 29 30	4 57 2	4 4 10	2 1 14	23		
8	0 39 46	2 57 16	4 31 36	4 56 34	4 1 2	2 56 14	22		
9	0 44 44	3 1 18	4 33 42	4 56 2	3 57 54	2 51 14	21		
10	0 49 36	3 5 18	4 35 38	4 55 12	3 54 36	2 46 12	20		
11	0 52 32	3 9 10	4 37 34	4 54 40	3 51 18	1 41 8	19		
12	0 59 22	3 13 2	4 39 22	4 53 48	3 47 42	1 36 0	18		
13	1 4 14	3 16 52	4 41 8	4 52 54	3 44 24	1 30 52	17		
14	1 9 10	3 20 36	4 42 46	4 51 52	3 40 50	1 25 40	16		
15	1 14 0	3 24 18	4 44 20	4 50 48	3 37 14	1 20 28	15		
16	1 18 48	3 27 56	4 45 50	4 49 36	3 33 38	1 15 14	14		
17	1 23 38	3 31 32	4 47 16	4 48 20	3 29 44	1 9 58	13		
18	1 28 24	3 35 2	4 48 34	4 46 56	3 25 52	1 4 40	12		
19	1 33 10	3 38 38	4 49 50	4 45 30	3 21 58	0 59 22	11		
20	1 37 54	3 41 54	4 50 58	4 43 56	3 17 58	0 52 2	10		
21	1 42 34	3 45 16	4 52 4	4 42 18	3 13 56	0 48 42	9		
22	1 47 16	3 48 32	4 53 0	4 40 34	3 9 48	0 43 20	8		
23	1 51 54	3 51 46	4 53 36	4 38 46	3 5 38	0 37 56	7		
24	1 56 32	3 54 54	4 54 42	4 36 48	3 1 24	0 32 32	6		
25	2 1 8	3 58 0	4 55 26	4 34 56	2 57 6	0 27 8	5		
26	2 5 40	4 1 0	4 56 2	4 32 44	2 52 44	0 21 44	4		
27	2 10 12	4 3 58	4 56 36	4 30 30	2 48 18	0 16 18	3		
28	2 14 40	4 6 56	4 57 2	4 28 18	2 43 50	0 10 52	2		
29	2 19 8	4 9 38	4 57 34	4 25 58	2 39 17	0 5 26	1		
30	2 23 32	4 12 20	4 57 42	4 23 30	2 34 42	0 0 0	0		
	Sig. 11. +	Sig. 10. +	Sig. 9. +	Sig. 8. +	Sig. 7. +	Sig. 6. +			

By the foregoing Theory of Computation, in Vogue to *Street's Time* and *since*, the Astronomers have been *hammering* out their new Theories and Equation Tables, (down to the Time of Sir *Isaac Newton*,) for computing the Moon's Place to a *Hair Splitting* Precision. Though their Methods and Conclusions differ from one another almost as much as the Orbits of the several Planets in their Forms and Dimensions, considered as Ellipses, that were originally considered as Circles.

Our Countryman *Horrox* first *hammered* out a farther Improvement of the *old lunar Theory*, for computing the *Moon's Place* to a Degree of Precision; which the diligent *Flamsteed*, by *over-hammering* his Work, farther improved, but still left *defective*.

Then the sagacious Dr. *Halley*, (like an able *Silversmith*,) by his Skill in specific Gravities, discovered more *false Metal*, or *Alloy*, in the *old Composition* of Theory, which he refined to a Degree of greater Purity.

The celebrated Sir *Isaac Newton*, (like a most accomplished *Goldsmith*, or *Alchemist*,) by his deep Penetration into the Secrets of Nature, discovered farther *Dross*, or *Alloy*, in the false Composition of this Theory, (as *Archimedes* discovered the Silver mixed with the Gold in King *Hiero's Crown*,) and

gave

TABLE II. MOON'S VARIATION-EQUATION, according to *Flamsteed*

Argument. Moon's Distance from the Sun.

o	Sig. 0 6 } add	Dif.	Sig. 1 7 } add	Dif.	Sig. 2 8 } add	Dif.	o
0	0' 0"	1' 18"	32' 31"	0' 38"	32' 31"	0' 40"	30
1	1 18	1 19	33 9	0 36	31 51	0 43	29
2	2 37	1 19	33 45	0 33	31 8	0 45	28
3	3 56	1 18	34 18	0 31	30 23	0 47	27
4	5 14	1 17	34 49	0 28	29 36	0 50	26
5	6 31	1 17	35 17	0 26	28 46	0 52	25
6	7 48	1 17	35 43	0 23	27 54	0 53	24
7	9 5	1 16	36 6	0 20	27 1	0 56	23
8	10 21	1 15	36 26	0 18	26 5	0 57	22
9	11 36	1 15	36 44	0 15	25 8	1 0	21
10	12 51	1 13	36 59	0 12	24 8	1 1	20
11	14 4	1 12	37 11	0 10	23 7	1 3	19
12	15 16	1 12	37 21	0 7	22 4	1 4	18
13	16 28	1 10	37 28	0 4	21 0	1 6	17
14	17 38	1 9	37 32	0 1	19 54	1 7	16
15	18 47	1 7	37 33	0 1	18 47	1 9	15
16	19 54	1 6	37 32	0 4	17 38	1 10	14
17	21 0	1 4	37 28	0 7	16 28	1 12	13
18	22 4	1 3	37 21	0 10	15 16	1 12	12
19	23 7	1 1	37 11	0 12	14 4	1 13	11
20	24 8	1 0	36 59	0 15	12 51	1 15	10
21	25 8	0 57	36 44	0 18	11 36	1 15	9
22	26 5	0 56	36 26	0 20	10 21	1 16	8
23	27 1	0 53	36 6	0 23	9 5	1 17	7
24	27 54	0 52	35 43	0 26	7 48	1 17	6
25	28 46	0 50	35 17	0 28	6 31	1 17	5
26	29 36	0 47	34 49	0 31	5 14	1 18	4
27	30 23	0 45	34 18	0 33	3 56	1 19	3
28	31 8	0 43	33 45	0 36	2 37	1 19	2
29	31 51	0 40	33 9	0 38	1 18	1 18	1
30	32 31		32 31		0 0		0
	Sig. 5 11 } sub.		Sig. 4 10 } sub.		Sig. 3 9 } sub.		

gave it his farther (and, as he conceived, almost finished) Refinement. At the same Time he recommended it to be tried in *Syzygies*, *Quadrants*, and *Octants*. Mean while Mr. *Flamsteed* boasted of his having furnished the Gold that went to the composing the Ring of this refined Composition; which being afterwards tried in the Crucible of Dr. *Halley's Luna Meridiana*, (see the End of his Tables,) was still found to be *defective*. So that, as the *Dross* of the most refined lunar Theory seems not to admit of an entire Separation, (except some greater *Alchymist* should spring up, to transmute it entirely into pure Gold,) we must make the *best Shift we can* with the present Composition, or such *lunar Theories* as we have, by making one sometimes serve in the Room of another; since there is no Certainty to be found in any.

After the great Sir *Isaac Newton* had failed in the Correction of the former lunar Theory, the foreign Astronomers considered the *old Theory*, like an ill-cut or ill-contrived Coat, not fitting the Heavens. They all went to work, (like so many Botch-Tailors,) by piecing, patching, and botching it, one after another, from *Euler* to *Mayer*, and down to *Clairaut*. And though by this Method

TAB. III. Logarithms of the Moon's Dist. fr. the Earth, according to *Street*

Argument. Moon's mean Anomaly.							
o	Sig. o.	Sig. 1.	Sig. 2.	Sig. 3.	Sig. 4.	Sig. 5.	o
0	5.029668	5.026200	5.016277	5.001610	4.985591	4.972970	30
1	5.029664	5.025968	5.015851	5.001074	4.985088	4.972665	29
2	5.029653	5.025728	5.015419	5.000537	4.984588	4.972368	28
3	5.029633	5.025482	5.014982	4.999998	4.984093	4.972081	27
4	5.029606	5.025228	5.014540	4.999458	4.983602	4.971802	26
5	5.029571	5.024967	5.014093	4.998917	4.983116	4.971534	25
6	5.029528	5.024699	5.013640	4.998375	4.982634	4.971274	24
7	5.029477	5.024424	5.013183	4.997832	4.982158	4.971025	23
8	5.029419	5.024142	5.012722	4.997290	4.981686	4.970785	22
9	5.029353	5.023853	5.012255	4.996747	4.981220	4.970555	21
10	5.029279	5.023557	5.011784	4.996203	4.980759	4.970335	20
11	5.029197	5.023254	5.011309	4.995659	4.980304	4.970126	19
12	5.029108	5.022944	5.010830	4.995117	4.979856	4.969927	18
13	5.029012	5.022628	5.010346	4.994575	4.979412	4.969738	17
14	5.028907	5.022304	5.009858	4.994033	4.978975	4.969559	16
15	5.028794	5.021974	5.009367	4.993492	4.978545	4.969391	15
16	5.028674	5.021638	5.008871	4.992952	4.978120	4.969232	14
17	5.028547	5.021294	5.008371	4.992412	4.977703	4.969085	13
18	5.028411	5.020945	5.007869	4.991874	4.977293	4.968944	12
19	5.028268	5.020590	5.007363	4.991337	4.976890	4.968822	11
20	5.028118	5.020228	5.006853	4.990803	4.976494	4.968706	10
21	5.027960	5.019860	5.006341	4.990270	4.976106	4.968602	9
22	5.027794	5.019485	5.005826	4.989739	4.975724	4.968509	8
23	5.027621	5.019105	5.005307	4.989211	4.975351	4.968427	7
24	5.027440	5.018718	5.004786	4.988685	4.974986	4.968355	6
25	5.027252	5.018326	5.004262	4.988162	4.974629	4.968294	5
26	5.027057	5.017928	5.003736	4.987641	4.974280	4.968244	4
27	5.026854	5.017523	5.003207	4.987124	4.973939	4.968206	3
28	5.026643	5.017113	5.002677	4.986610	4.973607	4.968179	2
29	5.026425	5.016698	5.002144	4.986099	4.973284	4.968162	1
30	5.026200	5.016277	5.001610	4.985591	4.972970	4.968156	0
	Sig. 11.	Sig. 10.	Sig. 9.	Sig. 8.	Sig. 7.	Sig. 6.	

Method they have brought the Coat to fit extremely near, (as the only Way they conceived practicable when the Force of Genius, Reason, and Imagination had failed in so many great preceding Artists,) yet, as it is found that the Heavens (the *Wearer* of the Coat,) frequently alter, (like a corpulent Man, growing fatter or leaner,) all the Botch-Tailors in Europe cannot adjust the Coat's true Shape and Dimensions, except for the present: But farther *piecing*, *patching*, and *botching* the lunar Theory must be the Resource of every Generation of Astronomers. Yet all these Surveyors and Agents of the Heavens would have us believe, that the several Materials, of which the lunar Theory is composed, are every one honestly imported from the lunar Orbit, according to the strict and unerring Laws of Nature, which are upon Record and known to a Hair.

M. Clairaut's Agent, or Foreman, M. Martin, has promised us the Perturbations of the Moon, Venus, and Jupiter, (three disturbing Neighbours,) consisting, it is supposed, of about twenty, or thirty Equations more, when we have the Happiness to see them produced; being the Cabbage slyly detained from the last cut-out Coat of the Theory. See Vol. III. Part I. End of M. Martin's Introduction to Clairaut's Astronomical Calculations.

NEW

The Earth and Moon are affected by the Sun and Planets in a forcible Manner: causing a continual Change of their Orbits and period. Revolutions, which become sensible after a short Time. Therefore, as the Earth and Moon undergo continual Changes, (but the Moon's Orbit the more sensibly,) the present lunar Tables will nearly answer to Observation, but for a short Period. And these Changes invalidate and unsettle all lunar Theories of the Moon's Motions, (except for a short Space,) by the Perturbations of the Sun, Moon, Earth, and Jupiter; which can only be compensated by an allowed Variation of mean Motion, from the best and most diligent Observations. And it is the Work of succeeding Ages to correct and improve the lunar Tables to the utmost Accuracy, while the mean and true Motions of the Moon undergo so many Changes.

PALLADIUM-AUTHOR.

The whole Central, the greatest mean Central, Erection, and Variation, are found to differ by some Minutes, to answer the same End of true Computation. Hence what has been objected to by the Mathematicians, that Astronomy is deficient of Geometry, to render Computation accurate, is a Truth but too evident.

N. B. The lunar Tables in the Royal Astronomer are founded on an Acceleration of the Moon's mean Motion, so as to answer an useful Nearness of Computation for a near or remote Period.

December 5^d 9^h 8^m 5^s O. S. }
By Royal Astr. p. 61, 71, and 74. fr. } 1^h 15^m 43^s 42^u } † Includ. larg-
annual, centr. & Variat. Equations.† } ger Eq. D Ap,
By Clairaut's Tables 1 15 41 37 . 1 38 49 prop. m. Anom. whereby her
Observed by Halley 1 15 42 12 . 1 38 37 is ascertain'd.

The Durbam Tables (according to which the Royal Astronomer is improved by a Supplement thereto) are extremely accurate for the present Period, not to be exceeded by any; and prove the indefatigable Assiduity, as well as accurate Judgement, of the honourable and much esteemed Author.

PROMOTIONS dans les REGIONS de la LUNE.

1. Le Docteur en Cometes, Monsieur D'Oen, élevé à etre le grand et royal Astronome de l'Observatoire lunaire, autrement appellé le Temple de Bellatrix. A ce Monsieur aussi est assigné l'Office de se prêter aux Calculs des Evenemens futures, de toutes Gibbosités, Décotomies, et Falcations. De plus, il doit faire accrediter les Propriétés des Inhabitans qui participent de la Nature de Salamandres: Et, pour Comble de sa Gloire, il doit etre le Successeur de la bonne Mere Sbipton.

2. M. de Vitchit, et Guillaume de Blondre, Chevaliers de la bleüe Poste, et Sous-Calculateurs de Riens, ou Nautiques, élevés à etre Grand Maitres de la Societé de Longitudes, Calculateurs de Nativités, et Presidents de l'Art necromantique.

3. Signor Montano di Naresborano, Calculateur des Evenemens futures en ordinaire, élevé à la Dignité de Prognosticateur General de Cometes et nouveaux Mondes.

4. Monsieur Ironside, et Monsieur Brags, ce dernier Chasseurs de Cheminés en particulier, mais tous deux Membres de la Societé de Macquirkers, Coupeurs, et Assassins, élevés à etre les Gardes des Betes sauvages de la Tour, autrement appellé Newgate.

5. Madame Sophie de Vagtail, Directrice de Chaises-percées et Pots de Chambre, élevée à etre la Princesse Gouvernante de l'Ecole de Venus.

Mr. Martin's MIRROR, OF WONDERS OF elliptic NAVIGATION (in a 2^d Octavo Pamphlet, copied, like our idle Fashions, from the French Connoisseurs in Trifles) are epitomized into no Use and no Wonder at all! For the idle Refinements or trifling Corrections of elliptical Sailing by the Spheroid, instead of the Sphere, are insensible, or swallowed up in the very large and unavoidable Errors of the Course and Distance, and so become of no real Use, as has been proved by several Examples, at p. 283, and following, of Royal Astronomer and Navigator; shewing the Inutility of Mr. Martin's Folio Volume on the same trifling Subject. That whatever Injustice he may have received from the Discouragement

ment of his *Dromometers, Magnetic Compasses*, 100 Times stronger than the common Sort, his *Patent Ship-Pump*, and other Schemes of Emolument, he has not certainly received, nor can receive, any from his justly rejected *elliptical Navigation*. Who admits that *Plain Sailing*, for a Day's Reckoning, (as he has been told,) is sufficient and preferable to *circular Sailing*, according to the Globes, which we assure all inexperienced theoretic Navigators, never at Sea, can no more be put in real Practice than sailing by the *Spheroid*. And therefore the plainest and shortest Rules, according to usual Practice, (and not refined Theory,) are certainly best. Yet the following *Equations*, epitomized and improved from Mr. Martin's *Mirror*, are useful in *Astronomy*.

Five Nautical Equations, investigated by M. DE MAUPERTUIS, for solving the Cases in Nautical Astronomy.

Put	For	Angles.	Tan.	Relations.	Radius = 1.
r	Radius.			Prob. Between L, D, A, H.	
s	Sine	Declination	D	I. $rrb - rx = cy$. Or, $b - x = cy$.	
y	Cofine			Between L, D, A, Z.	
t	Sine	Latitude	L	II. $rrx + nk = rs$. Or, $x + nk = bs$.	
c	Cofine			Between L, D, H, Z.	
b	Sine	Altitude	A	III. $rynt + rmcx = msy$. Or, $yt + Ycx$	
k	Cofine			Between L, A, H, Z. [= Ysy].	
i	Sine	Hour-Angle from Noon	H	IV. $rcbt + nskt = rmku$. Or, $Xcb +$	
u	Cofine			Between D, H, A, Z. [$Xnk = mk$].	
m	Sine	Azimuth-Angle	Z	V. $mk = yt$. As $m : y :: t : k$.	
n	Cofine			N. B. These 5 Equations contain 20 particular astronomical Problems; any 3 of which 4 Quantities being given, the 4th may be determined, logarithmically, from these Equations	

When any Angle exceeds 90° , its Cofine and Tangent must be marked with a contrary Sign to the Sign in the Equations; because the Cofine, or Tangent, of an Angle above 90° is properly negative.

Mr. J. Eadon's Assertion, that his *Solut. to Qu. 369*, is the only correct one, is referred to public Judgement. If he determines how far both Travellers will go in $4\frac{1}{2}$ Days, travelling together, it will shew him whether a geometrical Progression, continually increasing, according to a given Law, can be uniform for Part of a Day, as he maintains.

NEW ÆNIGMAS.

I. ÆNIGMA 201, by Tho. Vaughan, A. M. of Morpeth, Northumberland.

ATTEND to me, Ladies, who never appear'd

In any Di'ry you have seen or heard.

My Forms they are various—Sometimes I am round,

Sometimes I am long, and sometimes oval found.

And if you consent to lend helping Hand,

To deck me out finely, I am vastly grand.

With Birds, Beasts, and Fish, you adorn me with Ease,

Trees, Plants, and fine Flow'rs, or what Things you please.

But since you are grown so judicious, indeed,

You place, very often, a Goose on my Head.

And when you've compleated me, it happens so,

A hot fiery Trial I must undergo.

But, till that is over, I'm of little Use,

Though, when past and over, few do me refuse.

The rich and the poor, great and small do agree,

Once each Year, at least, to call for me with Glee.

Take one Hint more, Ladies, to what has been said :

You must commit Murder before I am made.

II. *ÆNIGMA 202, by Mr. W. Swift of Stow.*

1. My Shape to tell it variously,
I'm oblong, and I'm square;
I'm long and short, and you shall see
I'm not unworthy Care.
2. The *Farmer* knows me very well,
And so does my *Lord's* Groom:
The *Hofler* can my Service tell;
Who always gives me Robm.
3. The *Ladies* lie in Beds of Down,
Who no Expences spare;
But one I held, who wore a Crown,
And did hard Usage bear.
4. The poor and hungry oft I feed,
In Winter and in Spring;
Yet serve the rich, in Time of Need,
And often serve the King.
5. When Things are to Destruction gone,
They're gone, they say, to me:
Ladies, then let my Name be known,
And I'll your Servant be.

III. *ÆNIGMA 203, by T. Vaughan, A. M. Morpeth, Northumberland.*

I you should search the *Globe*, you'll scarcely see
A Thing that's ten Times usefuller than me.
When young, I'm very frolicksome and gay,
But, come to Age, I'm never seen to play.
My youthful Frolicks all are innocent;
If I offend, it is not my Intent.
The Garments which I wear, both Day and Night,
Are very often black, but oftener white.
Sometimes, though rare, in black and white I'm seen:
But as for yellow, blue, or red or green,
I never wear them: If I did, you'd say
I was a *Ghoss*, and run from me away:
And yet I don't deny it has been told,
That some of us have been array'd in Gold.

Man for my Lord and Master I do own;
For him I live and die, it is well known.
King, Lords, and Commons of the Parliament
Are pleas'd with me: I give them all Content.
Homer and *Virgil*, those great *Bards*, agree
In owning Favours they receiv'd from me.
Newton and *Milton*, *Pope*, and *Swift*, and *Gay*,
Shakespear, and *Dryden*, *Farquhar*, and *Orray*,
Congreve, and *Johnson*, *Arterbury*, *Rowe*,
Were, ev'ry one, oblig'd to me, I know.
From what's been said, who does not me explain,
Is no great *Conjurer*, I will maintain.

IV. *ÆNIGMA 204, by Miss Stow.*

A Wonder strange in *England* does appear,
In *June* and *July*, those two Months, each Year:
Five Brethren at one Birth are always born;
But they are neither *Fish*, *Flesh*, *Blood*, nor *Bone*.
Two of the five have *Beards*, and two have none;
The other, *poorly clad*, owns *Half* an one.

V. *ÆNIGMA 205, by Mr. Swift.*

Say what I am, and tell me the Thing,
I will not wait on Lord or King:

THE BRITISH PALLADIUM, &c

I disregard all in my Way ;
 For not one Moment I can stay.
 The greatest Secret is in me,
 So *enigmatical* I be.
 A Secret am without all Doubt ;
 No Man could ever find me out.
 I'm always running, Night and Day ;
 Yet have no Legs, as some Folks say :
 Nor Mouth, nor Tongue ; yet rage and roar
 When I approach the *British* Shore.
 The *living* and the *dead* I bear
 Upon my Back, and none I spare.
 A Planet rules me in the Sky :
 Then tell me, Ladies, what am I ?

VI. ÆNIGMA 206, by Mr. Thomas Sadler of Whitchurch, Shropshire.

From *social* Mirth debarr'd, and dear Delight,
 We're doom'd to labour hard, from Morn to Night :
 And when we're station'd near some verdant Plain,
 With Arms out-stretch'd, we pull with Might and Main,
 Against each other, Arms to Arms we swing,
 To serve our Country and our gracious King,
 In *Winter's* Gloom, within some lonely Cell
 One of us *Brothers* is constrain'd to dwell ;
 And in this *Cavern* when he must abide,
 Upon his *Head* the other seems to ride.
 Thus put in *Motion*, one above the other,
 A *Bridge* betwixt us parts each loving Brother.
 Though both unskill'd in *mathematic* Rules,
 The *Classics*, and the Learning of the Schools,
 Yet, without *Figures*, we can well divide,
 Make round Things *square*, and twenty Things beside ;
 Can form new *Models* from great Bulk and Weight,
 Make strait Things *crooked*, and the *crooked* strait.
 Our *Labours* wrought upon the *British* Shore,
 Not *Euclid's* Genius furnish'd have the Store :
 And Wonders we at *London* oft have done,
 At *Durham*, not unknown to *Emerson*,
 That great Improver of *mechanic* Skill,
 Whose *Labours* are admir'd, and ever will :
 But yet his active *Genius* ne'er could find
 Out all the *Patterns* that we have design'd :
 Nor *Newton's* Judgement ever yet could pry
 Out all our *Secrets*, when he liv'd to try.
 Ladies, upon our *Labours* deign to smile,
 And add fresh *Vigour* to us all the while.

VII. ÆNIGMA 207, by Mr. Thomas Sadler.

Dear Ladies, from *Dublin* last Summer I came,
 With Attendants about me, to publish my Fame :
 And coming to *Chester*, I made a grand Show,
 Like famous *Draucansir*, as fine as a Beau.
 Assuming the *Wit*, strange Vagaries I had,
 And steering to *Portsmouth*, got drunk and was mad.
 I there shew'd my *Witchcraft*, and Folks did bewitch,
 And made no Distinction betwixt poor and rich.
 In the *Holiday* Time was a Knight of the *Post* ;
 No *Steel*, nor a *Robber*, more harden'd, at most :
 There I and my *Comrades* our *Pranks* did display,
 And some have reported I went to way-lay.

With *Sopbia's* Gin-Bottle we warm'd well our Hearts,
 And then were enabled to act well our Parts.
Bewitch'd well, we did as the *Spirit* then mov'd,
 And poor *Tea and Noy* all our Archnefs approv'd:
 And *Sopbia*, by Turns, the soft Rapture she feels,
 That made her high Spirits run down to her Heels.
 On the *Brinks* of her *Lips* I so freely did stray,
 That, in am'rous Sport, I quite melted away.

In Shape of a *Monster* I next did appear,
 And gallop'd about, like a bred dancing *Bear*.
 Like *Felon* on *Gibbet*, I totter'd on high,
 Myself then suspended, betwixt Earth and Sky.
 Not long I there stay'd; for down I came soon
 Commenc'd a *Bag-piper*, and play'd a *Scotch Tune*, }
 And Fortunes I told by the *Horns* of the Moon.

To *London* I rambled, and saw *Charing-Cross*;
 And saw the *King* mounted upon his black Horse.
 There gazing around me, slip'd down in a Cell,
 And surpris'd the Milk-Lasses, *Kate*, *Bridget*, and *Nell*.
 At *St. Giles's* and *Holborn*, I next play'd my Cards,
 And for my Exploits I receiv'd my Rewards:
 With *Chimney-Guard* Gentry my Notes I compar'd,
 Who sounded my Fame, and my Merits rever'd.

Not staying long there, to the *Play-House* I fled,
 And mock'd the sage Actors, by wagging my Head.
 With my Mouth turn'd *awry*, strange Tricks I then play'd;
 Surpris'd the grave Cit — with his Lady and Maid.
 To no Place I'm confin'd, in the City or Town,
 But, like a *Sweep-Chimney*, I rang'd up and down.
 A Shadow in Substance my Figure displays,
 Illum'd by *false Wit* of invisible Rays.

Such *strange* Contradictions must make you admire;
 My Father a *Tinker*, my Mother a *Squire*!
 From *Pedlar* and *Hawker* I sometimes descend;
 A *Hawker* of News was my very good Friend.
 My Brother a *Lady*, and my Sister a *King*;
 I pass here and there, like a Bird on the Wing, }
 And often I pass for a very *fine* Thing.

My Uncle's a *Bear*, but my Aunt was a *Queen*,
 And I the blind Beggar upon *Bethnal-Green*.
 My *Grandfather* frequently flew in the Air,
 But my *Grandmother* seldom, or never, came there.
 My *Great-Grandfire* sprang from th' *Hibernian* Land,
 But never knew Tossing where Billows command.
 Such a *Pedigree*, Ladies, you never did hear;
 But the Truth I'll aver, and my Story make clear.

How *fickle* is Fortune I believe it, ye Fair;
 Yesterday I was poor, and then fed upon Air;
 But to-day I look grand, and as fine as a Rake,
 With my Limbs, like my *Father's*, much given to *shake*.
 Like *Nestor*, I boldly have dar'd the proud Foe:
 At the Sight of the *French* how my Bosom would glow!
 For the *Longitude* once I was cur'd of the Itch;
 But after that Job I was warm'd by a *Witch*:
 I dy'd the last Winter, by good Mr. *Lee*,
 But again I'm alive, and as brisk as a Bee.
 So, Ladies, I hope, as the Riddle's quite clear,
 In next Year's *Palladium* my Name will appear.

THE BRITISH PALLADIUM, or

Whoever sends the best Answers to the following *Ænigma* before March next, has a Chance, by Lot, to win 5, 4, and 3 Palladiums.

PRIZE-ÆNIGMA, by Mr. James Brown Ashton, of Lincoln.

Ye Sons of bright *Phœbus*, *Ænigmatists* rare,
Ye Daughters of *Wisdom*, poetical Fair,
Disclose our Disguise, and our Uses unfold:
In the Temple of Fame shall your Names be enroll'd.

Two Brothers we are, and depend on each other;
But neither can boast of a Father or Mother.

By Man we were made; he first form'd our Construction:
But it is from the Earth we first claim our Production.

Of Remains of poor Creatures, design'd for Men's Food,
We partly consist, and the rest of us Wood.

Our Figure, says one, who oft quotes *Aristotle*,
Resembles the Form of big-belly'd Bottle.

But as to our Features, ah! there is the Case:

Old Time, sure as Death, fairest Forms will deface.

While young, and ere we cruel *Proofs* undergo,

Our Complexion resembles the Face of a Beau.

Though this we enjoy, and, like *Sophia*, at first,

We're admir'd for a Time, and not yet know the worst:

But by Transformation (O shameful to tell!)

We are chang'd to quite black, like the *D—ls* in Hell.

But this is suppos'd—though we're truly as black

As the Sweep-Chimney Crew, or the *Molromite* Pack.

To cleanse away Colours from either, you might

As well try to wash all the *Blackamoors* white.

But to make some Amends for our sable Disaster,

When most we are black, we the most serve our Master:

And he, we must own, most in us takes Delight

When we're all over black, and, like *Blackguards*, do fight.

We never were Friends to the *Molromite* Clan,

But Favours distribute to each honest Man.

Alternately we are both active and dull,

But active the most, when our Paunches are full.

In *Britain* our chief Food is *Wool*, but in *France*

They feed us with *Hair*, and then teach us to dance.

Men dance on their Feet, for the Sake of Embraces;

But we (the Reverse) always dance on our Faces.

As often as we, with our Oddity, dance,

As often we fight, and retreat, and advance.

Men and Cocks, when they fight for a slight Offence,

Use Weapons of Steel for their Aid and Defence;

But though we've no Weapons, Sword, Pistol, or Gun,

With Ardour we fight, and our Foes never shun.

Though we handle no Weapons, yet *Arms* we employ,

Which, alas! much conduce our whole Force to destroy:

And yet, for all that, Men our Wrongs still redress:

But, in Time of Alarms, we are forc'd by a *Press*.

Without Arms our Battles could never be fought:

Arms are our Supporters, as Words are to Thought.

We remain for a while, like *two Kings in the Field*,

Till Time works our Fall, and compels us to yield:

While the good forgive Faults, when Resentment surrenders,

Yet, like *two Fighting-Cocks*, place together Offenders.

Though so much has been said, yet this more understand;

Without us, all *Learning* would fly from this Land:

The *Palladium* of Science be turn'd out of Door,

And *Sophia* and *Horner*† could read it no more.

† A Lady and Squire, two Admirers of the *Palladium*.

NEW QUERIES.

I. QUERE 206, by Miss Polly Stow.

What Language is the best, impart;
To gain a Virgin Lover's Heart?

II. QUERE 207, by Mr. Thomas Sadler of Whitchurch.

When and by whom was England divided into Parishes?

III. QUERE 208, by Amicus.

What is the Meaning and Language of *Crom aboo*, the Motto of the Duke of Leinster?

IV. QUERE 209, by Clericus.

Whether the Conception of the blessed Virgin MARY, on December 8, is not placed wrong in the Calendar; seeing that the Birth of Christ was on the 25th of that Month? Or how is the Time of the Conception and Birth of Christ reconciled, as fix'd by our ecclesiastical Chronologers?

V. QUERE 210, by Anglicanus.

How is personal Identity to be infallibly ascertained by Name? or how is the particular personal Application of Name infallibly determined; since there are so many different Persons having not only their Surname, but Christian and Surname, alike, and living in the same Place?

VI. QUERE 211, by Historicus.

Whether an invalid (or invalidated) Understanding, or weak Body (according to the Scotch Phrase) is the more to be pitied? or whether Folly or Ignorance is the greater Misfortune?

VII. QUERE 212, by Miss Polly Stow.

Whether giving a Man what he wants is (in a grammatical Sense) not taking that Want entirely away? And whether Want or Shame, in another Sense, may not be given him, contrary to the Sense of taking Want or Shame away from him?

Whoever sends the best Answers to the following Prize-Quere, by the 1st of April next, shall be entitled by Lot, in Succession, to 4, 3, and 2 Palladiums.

PRIZE-QUERE, by Academicus.

Required (from the following Equations*) the Poles, Length and Breadth, and Acres, of a Piece of Land, in Form of a Parallelogram, exactly similar to the Dimensions of a Charity-School Teacher's Card-Bill, whose Dimensions are also requited in Inches.

$$\begin{aligned} & * x^y - y^x = 0.726729 \\ & \frac{\overline{1x}|^1y + \overline{1y}|^1x}{\overline{1x}|^1y + \overline{1y}|^1x} = 1.374971 \end{aligned} \left. \begin{array}{l} x = \text{Length} \\ y = \text{Breadth} \end{array} \right\} \text{ of the Parallelogram in Fur-} \\ & \hspace{15em} \text{longs.}$$

NEW REBUSES.

I. REBUS, by Mr. John Bailey, of Middleton, Yorkshire.

A Grecian Bard, fam'd for the lyric Strain;
 A Syrian Dame, by sensual Love once stain;
 A Lemnian Queen, whose Father's Life she sav'd;
 A Youth of Athens, that a Monster brav'd;
 A Prophetess, that Troy's Downfall foretold;
 A Grecian Sage discretely wise and bold:
 If these Initials you are pleas'd to join,
 They'll name a Fair, in whom all Virtues shine.

II. REBUS, by Thomas Vaughan, A. M. Morpeth, Northumberland.

A Bard's Christian Name, who made Sylvester rhyme;
 To which you must add the Beginning of Time;
 Half a Low-Country Town, where the Faculty go;
 And a Diarian Poet, at Home, you will know.

III. REBUS, by Mr. St. John.

A cunning Beast, and heavy Weight, when join'd,
 A noted Town in Leicestershire will find.

IV. REBUS, by Mr. St. John.

To what Methodists do when they preach and they pray,
 Join what they else do, when they sigh and then say;

Let

THE BRITISH PALLADIUM, or

Let the *Parson's* last Office to both added be,
And the *Name* of a fam'd *English* City you'll see.

V. REBUS, by Mr. John Bailey, of the East-Riding, Yorkshire.
To a Quaker's Consent join a Spirit from far,
And a Town's Name in *Yorkshire* from thence will appear.

VI. REBUS, by Mr. James Brown Ashton, of Lincoln.
To the Sound of the *Night* join a Weight that is great;
'Twill the Name of a Village, near *Lincoln*, complet.

NEW PARADOXES.

I. PARADOX, by Miss Polly Stow.

THERE is a Child born of my Mother,
Is neither my Sister nor my Brother;
But is *natural* born, as other Children be:
What is this Child, d'ye think, a-kin to me?

II. PARADOX, by Mr. Thomas Sadler, of Whitchurch.

OUR Neighbour has a loving Wife,
That brought him, at one Birth,
Three Pigs, six *Calves*, and all with Life,
(What Wonders are on Earth!)
It came to pass, and is, no Doubt,
Dear Ladies, can you make it out?

NEW QUESTIONS.

I. QUESTION 401, by Mr. Sadler, of Whitchurch.

TELL me her Name,* whose *Equal* can't be found
In all the Circle that the Sun goes round.

$$\left. \begin{aligned} w^3 + x + y + z &= 57 = a \\ w + x^3 + y + z &= 2763 = b \\ w + x + y^3 + z &= 1353 = c \\ w + x + y + z^3 &= 153 = d \end{aligned} \right\} \begin{array}{l} w, x, y, \text{ and } z, \text{ represent the Numbers} \\ \text{of the Places of the Letters in the Alphabet} \\ \text{composing her Name.} \end{array}$$

II. QUESTION 402, by Mr. Sadler,

A lofty Tow'r ascends unto the Sky;
To find its Height, *Palladium* Artists, try;
A Rope from Top, quite reaches to the Ground,
Whose Length, in Feet, by easy Rules,† is found:
A Flyer on this Rope descends in Sight;
How high the Tower from whence he took his Flight?

$$\left. \begin{aligned} \sqrt{x} + xy^2 &= 62510 = a \\ \sqrt{y} + yx^2 &= 250005 = b \end{aligned} \right\} \begin{array}{l} \text{Note, } x = \text{Length of the Rope, and } y \\ \text{the Distance, on a Level, from where} \\ \text{the Rope is fixed at the Ground, to the} \\ \text{Foot of the Tower.} \end{array}$$

III. QUESTION 403, by Mr. William Pen, of Chalfont.

A Person has three several Sums due at the End of three different Times, viz. 520*l.* due at the End of 1 Year, from a Principal put out at 4 per Cent, simple Interest; 100*l.* due at the End of 5 Years, from a Principal put out at 5 per Cent. and 1600*l.* due at the End of 10 Years, from a Principal put out at 6 per Cent. But the Lender would receive the whole of those 3 Sums together, by letting the Interest of each take Place at another Rate, to which the Borrowers agree, till that Sum, at one Time, is due. Required, in what Number of Years must he receive the Sum of the said several Amounts, viz. 3130*l.* for the Amount to be the same, at one Time, as at the End of the several different Years, allowing simple Interest? And what will be the Rate per Cent. simple Interest, to be allowed for the Time the Money is put out?

IV. QUESTION 404, by Mr. William Pen, of Chalfont.

A General disposing of his Army, into square Order, finds he has 71 Soldiers over and above the Square; but increasing each Side with one Soldier, he finds 276 Soldiers are wanting to fill up the Square. How many Soldiers had the General in the Field?

V. QUESTION

V. QUESTION 405, by Mr. William Chapman, of Foxton, Leicestershire.

IF a Person has 17 Years to commence in an Estate of 40*l.* a Year; required the Value of the *Reversion*, or Worth of the same in present Payment, to continue for ever to the Purchaser, when, after the Expiration of 17 Years, the Estate is already sold for 30 Years *Purchase*?

VI. QUESTION 406, by Mr. William Chapman.

SUPPOSE a *Musquet-ball*, of an Ounce Weight, to be shot out of a *Musquet*, 2100 Feet, perpendicularly upwards: Required, with what Force (respecting Weight) this Ball will strike the Ground at its Return to the Earth's Surface?

VII. QUESTION 407, by Miss Polly Stow.

A Father at his Death left by his *Will* 1000*l.* to be divided between his Son and Daughter, in such a Manner, that a *fifth* Part of his Share should exceed a *fourth* Part of her's by 10*l.* How must the 1000*l.* be divided?

VIII. QUESTION 408, by Mr. William Taylor, of Dodsworth, Yorkshire.

PALLADIAN Artists, be so kind,

The Fences of a Field to find:

Triang'lar is the Form of Ground;

Its *Area* twice twelve Chains was found.

One *Angle*, at the Base, I knew

Just thirty-six, and fifty-two, † † 36° 52'

And cub'd when every Side shall be,

The Sum you underneath* may see.

* 1728 Chains = Sum of the Sides cubed.

IX. QUESTION 409, by Mr. Thomas Sadler.

REQUIRED to find the greatest Ellipsis, that can be inscribed in a *Sector*, whose Radius is 20, and Angle 130 Degrees.

X. QUESTION 410, by Mr. William Hardy, of Cottingham School.

THERE is an *Island*, 73 Miles in Circumference, and three Footmen all set out together, to travel round it, the same Way. A travelled 5 Miles a Day, B 8, and C 10: Required, in what Time they will all meet together, after first setting out. See p. 288 of Birk's Arith. who makes it 5329 *Ds.*—Doubted.

XI. QUESTION 411, by Mr. Lyon, of Margate.

AT what Rate, per Second of Time, would a Cannon recoil, weighing 640*lb.* and at free Liberty to move, that gives a twenty-four Pound Shot an uniform Velocity, at the Rate of 640 Feet per Second of Time?

XII. QUESTION 412, by Mr. Lyon, of Margate.

A Ship, bound to *Barbadoes*, sails from the Island of *Madeira*, between the South and West, 276 Miles; and on the 27th of April, in the Forenoon, being obliged to lie to, the Sun's *Altitude* was then taken 22° 7'; and, in $\frac{3}{4}$ of an Hour after, was taken 27° 17'; while the Ship continued lying to, where there was no Current. Required, from thence, to determine the Ship's Place; and her Course and Distance to her intended Port, according to *Mercator-Sailing*.

XIII. QUESTION 413, by Mr. Alexander Rowe, in Cornwall.

IN what Place, the Day explore,

When Night to Day is one to four.

XIV. QUESTION 414, by Mr. Brent, Author of the Compendious Astronomer.

A cylindrical Beam, *ceteris paribus*, (all Things alike equal) is given 11 In. long, every Inch weighs an Ounce; the *Fulcrum* is placed one Inch from the Extremity of the Beam: Required the Weight necessary, in the Scale, Half an Inch from the shortest End of the Beam, to poise the other in *Equilibrio*.

XV. QUESTION 415, by the PALLADIUM-AUTHOR.

TO find the Latitude of the Place from two observed Altitudes of the Sun, and the intermediate Time of Observation by the Watch. — Mr. Maskelyne performs it by a difficult and tedious Operation, from supposing the Latitude (begging the Question) p. 76, *Mariner's Guide*, which is needless to suppose, because it may be performed by direct Operat. from what follows.—EXAMPLE. Jan. 22^d, 1761,

THE BRITISH PALLADIUM.

74 at 9^h 24^m 21^s, Forenoon, by Watch, the true Altitude of the Sun's Center was observed, at Sea, to be 13° 50'; and at 10^h 56^m 38^s was observed to be 26° 24'; Difference of Time of Observations, 1^h 32^m 17^s; Sun's Declination 15° 34' S. at Middle Time of Observations. Required the Latitude N. by the shortest Method.

XVI. QUESTION 416, by Mr. Alexander Rowe, of Reginnis, Cornwall.

WHAT is the Value of x , when $\frac{1}{x^6} |^{2x}$ of a Shilling is a Maximum?

XVII. QUESTION 417, by Mr. W. Hardy, of Cottingham-School.

GIVEN $xx+y+z = \frac{xx}{2} + \frac{y^2}{3} + \frac{z^2}{4} = 3xx + \frac{yy}{2}$: To investigate,

from thence, three general Theorems, expressing the Values of x , y , and z , respectively; and to bring out one Answer, at least, in whole Numbers.

XVIII. QUESTION 418, by Mr. Stephen Hartley, of Sowerby-Bridge.

REQUIRED, in what Latitude North, the shortest Day is equal to $\frac{8}{13}$ of the longest.

XIX. QUESTION 419, by Mr. J. H. of Lewes.

MERCHANTS buy Coals by the Standard-Bushel, and some sell them out again, by the Half-bushel Measure, whose Height from the Bottom to the Top is $8\frac{1}{2}$ Inches; and $12\frac{1}{2}$ Inches in Diameter or Breadth. And Coals being both bought and sold, by heaping them as long as they will lie upon the Top of the Measure, in a tapered Figure, or Cone; and the Cone (or Cope, as some call it) lying on the Top of the Bushel-Measure, being a great Deal more than twice as large as the Cone (or Cope) lying on the Top of the Half bushel Measure. Required, from thence, the Merchant's Gain, when he sells out his Coals by the Half-bushel, that he buys by the Bushel Measure. Or, what the Buyer loses, buying by the Half-bushel instead of by the Bushel Measure.

XX. QUESTION 420, by Capt. Edward Williams, of the Royal Artillery.

WHAT will be the Value, in Pounds Sterling, of 45 Globes of solid Gold, inscribed in a Cone, whose Altitude and Diameter of its Base are each 45 Inches, the largest Globe touching the Base, and Sides of the Cone; and the lesser Globes touching the Sides of the Cone, and each other; supposing the Gold to be worth 4l. an Ounce, and that 1 cubic Inch Weight 10.36 Ounces?

XXI. QUESTION 421, by Mr. Robert Langley, of Hitchin.

A Gentleman has a triangular Garden, whose Sides are 8, 12, and 14 Chains. His House is situate in the longest Side, and he would have a Walk made from thence to the opposite Corner, so that the other 2 Sides of the Garden may appear under the same Angle in every Part of the Walk; from hence the Length of the Walk is required, with a geometrical Construction of the same.

* * * Whoever answers the following Question properly, by March the 1st next, has a Chance, by Lot, to win 12 Palladiums.

PRIZE-QUESTION, by Capt. Edward Williams, of Woolwich.

THERE are two Towers situated at the Distance of 50 Yards on the Plane of the Horizon, and the Difference of their Heights is 12 Feet: A Shot being fired, with a certain Velocity and Direction, from the Top of the lower Tower, at the same Instant that a Ball was dropt from the Top of the higher; the Shot struck the Ball at the Distance of 12 Feet from the Ground; but being fired in another Direction, with the same Velocity, the Shot struck the Ball at 6 Feet from the Ground. It is required to determine the Directions and Velocity of the Shot (supposing it to move uniformly in a Right-Line), and also the respective Heights of the Towers: And to construct the Problem geometrically.

Our other Correspondents shall be obliged as soon as possible.

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THE END.

